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STEEL

FOR FORTY-EIGHT YEARS—IRON TRADE REVIEW

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PRODUCTION · PROCESSING · DISTRIBUTION · USE

Two views of the Double Carry-over Cooling Bed. This bed receives the bars from the Finishing Train and Dividing Shears, and passes them on to the Bar Shears. Notice that the bars lie straight and are even at the ends. In the background is seen the Chain Coil Conveyor, automatic "Take-off," and Coil Hook Carrier. MORGAN CONSTRUCTION COMPANY, Worcester, Massachusetts.

R47

As the Editor Views the News

■ BUSINESS news last week was favorable. Current indications (p. 73) are that January will see an improvement in the demand for steel, particularly from the railroads and the construction industry. STEEL'S index of industrial activity (p. 35) has moved up again to a new high for the year and now stands at 100.7. The maritime commission (p. 18) has awarded contracts for three ships involving nearly ten million dollars, and much additional ship tonnage is in sight. Although the index for machine tool orders (p. 21) dropped 5 per cent in November this was due to reduced foreign business. Domestic orders for machine tools in November were the highest of the year. In the meantime, as usual at the year's end, steel production (p. 21) is falling slightly.

. . .

Stainless 25 Years Old

Notable events high-lighted last week's news. That new wonder of steel, the huge Irvin works of Carnegie-Illinois Steel Corp., received its official house-warming Thursday when some sixteen hundred visitors (p. 17) inspected it. The new mill (p. 40) has capacity for about 600,000 tons of flat-rolled material annually, and is equipped to meet all requirements. . . . Another spectacular event at Pittsburgh last week was the celebration by the stainless steel industry (p. 19) of the twenty-fifth anniversary of the discovery of this metal. . . . There is every indication, says a senator, that the national labor relations act (p. 32) will be revised materially at the next session of congress and that the labor board will be stripped of its judicial powers.

. . .

Reduce Auto Work-Week

Two automobile builders, in response to demands intended to protect the senority positions of 6000 unemployed workers, last week (p. 29) reduced their work-week 20 per cent to 32 hours, but without taking on more men. The state unemployment law is reported to be influencing one Michigan manufacturer to farm out parts production to outside interests rather than build up its force temporarily. This disposition has been reflected in other directions. . . . A steel company (p. 21) is offering to sell houses to employes at approximately half their cost. . . . Modernization of railroad equipment, one authority estimates, would require the expenditure (p. 25) of a billion dollars a year over the next ten years.

. . .

Needed: Capital

The problem of providing work for our unemployed can be solved only by directing more capital into job-producing investments; the answer, says a well-known machine tool builder (p. 38) must be found at Washington. . . . Improved sealing systems now available (p. 44) protect lubricating oils and greases from contamination in use. . . . A carefully organized work progression system at a large machine tool plant (p. 47) aids production; various types of handling equipment promote efficiency. . . . Recent tests show fatigue endurance of helical springs, whether formed from plain carbon, acid, basic or electrical steels, is fairly uniform. Difference in stress resistance of the four materials (p. 54) is slightly less than 5000 pounds per square inch.

. . .

Continuous Galvanizing

An ingenious production line has been arranged by a tramrail manufacturer (p. 56) for the fabrication of welded arch-beam rails. . . . Modern equipment for continuous galvanizing of steel sheets operates at 25 to 100 feet per minute. Successful practice at these speeds (p. 62) calls for correct design factors in the furnaces. . . . Resilient tubing now is produced in varying wall thicknesses, diameter and any desired length by knitting a single strand of wire. The tube (p. 63) can be made as rigid or flexible as required. . . . A new magnetic alloy (p. 64) may be of varying analyses so as to give best results at any desired temperature. . . . Improved temperature indicating instruments facilitate control (p. 65) of rolling mill speeds and drafts.

To all a Merry Christmas!

E. L. Shaner

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Sixteen Hundred at Dedication of Irvin Works, "Symbol of Modern Industry"

■ SIXTEEN hundred industrial and business leaders last Thursday attended formal opening of the "Mill on the Hill," Carnegie-Illinois Steel Corp.'s $60,000,000 Irvin works, near Clairton, Pa.

Guests, including officials of many steel consuming companies, came from all sections. Special trains were run to Pittsburgh from New York, Cleveland, Chicago and other major centers.

Visitors were taken on a five-mile inspection trip through the recently completed works, one of the largest and most modern sheet, strip and tin plate plants in the world. They had luncheon at the mill, and in the evening, dinner in the William Penn hotel in Pittsburgh.

Two special trains carried guests from Pittsburgh to the mill site, a man-made plateau towering 227 feet above the Monongahela river. In the morning the hot mill was inspected. After lunch, the itinerary included the cold mills and the tin plate mill.

Taylor Speaks from London

Heading the throng of visitors was the man for whom the mill was named, William A. Irvin, vice chairman and former president, United States Steel Corp. As Mr. Irvin entered the mill, he was met by J. F. Deasy, vice president in charge of operations, Pennsylvania railroad, and presented with a telegraph key which Mr. Irvin had used when he was a telegrapher with the railroad 50 years ago.

The Pennsylvania railroad, Mr. Irvin's first employer, incidentally placed the first railroad steel order with the Irvin works, for 1045 tons of sheets.

Highlighting the banquet in the evening was an address by Myron C. Taylor, former chairman and a director, United States Steel Corp. Mr. Taylor spoke from London, where he is working on the problem of resettling refugee populations, by transatlantic telephone.

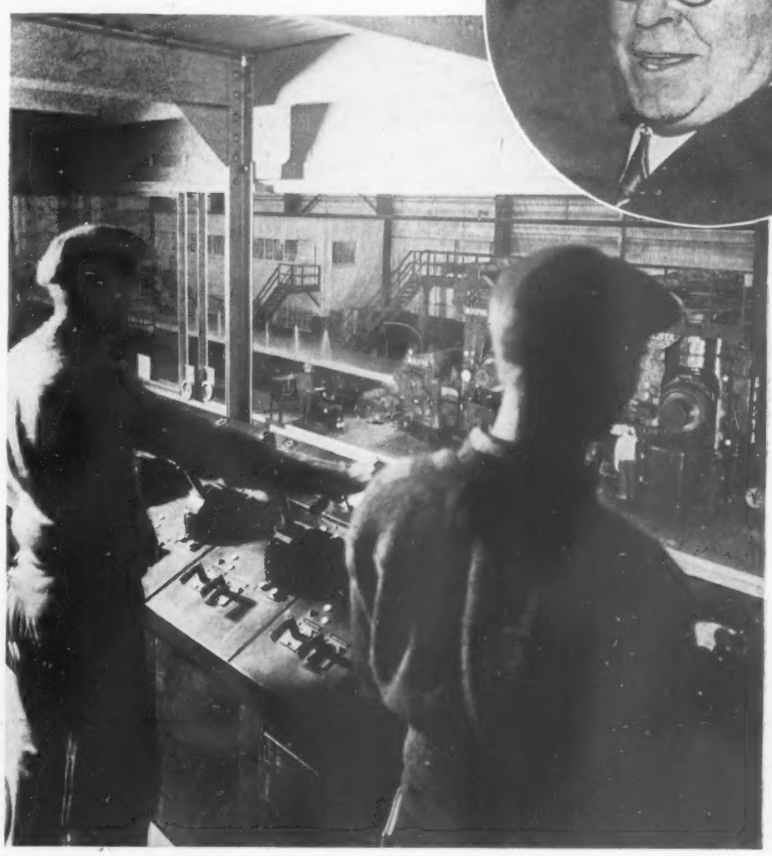
"This great and modern steelworks," said Mr. Taylor, "is symbolical of America, of twentieth century industrial civilization. It marks the culmination in its field of man's planning and labor through the centuries. It brings to man's aid a tool he has never had before . . .

"Its inspiration goes to the credit of no individual. It holds the massed offerings of thousands of men—some of whom are still with us and some of whom have long since gone . . .

"The funds that support our enterprise are garnered daily from the corners of the earth. The funds that built it were the accumulations through the years drawn from the labor and thrift of men and women everywhere.

"In this far-flung field of owner-

■ It was May 22, 1937 when William A. Irvin (right) broke ground for the mill that bears his name. In the celebration last week Pennsylvania railroad presented him with the telegraph key which he used on his first job 50 years ago; placed the first railroad order, 1045 tons of sheets. Below: One of the control pulpits



ship, all the states and most of the foreign lands are investors. A great many of the workers in the corporation's plants have left their savings to be used in the company's activities, and for the public's and their own future benefit.

"No single individual owns so much as ½ of 1 per cent of its capital stock. So that in a real sense it represents the savings—in other words, capital—of men and women. That is what I call a practical, working democracy in ownership."

Mr. Taylor continued: "We rejoice particularly in the happy relationship which exists among all our workers who have contributed to design, to create and to operate it. Among them are no class distinctions, no narrow religious lines of feeling, no color and no race discriminations. They are a cross-section of America."

Benjamin F. Fairless, president, United States Steel Corp., dropped a hint further expansion at the works may be expected. Concluding his address, he said: "Our expectations include the expansion of the Irvin by additional units of production, in the not far distant future."

Mr. Fairless paid rich tribute to Mr. Irvin's "unexcelled leadership and pre-eminent executive ability."

Bigness Necessary in Steel

In planning and constructing the plant, said Mr. Fairless, every effort was made to assure the safety and comfort of employes. All moving parts of machinery have been guarded, the best of lighting facilities, ample work spaces, comfort stations and rest rooms have been provided. The plant includes adequate parking space for employes' automobiles.

Mr. Irvin stressed the necessity for large and modern plants. A certain bigness is necessary in the steel business to do the things demanded by correlated industry and the consuming public. All products for use by society must eventually be made where they can be produced and distributed at lowest cost.

To illustrate his point, Mr. Irvin compared today's steel prices with those of 1926, often considered a normal price year. Only a few products are higher; a large majority of steel products are lower.

"Comparative price figures alone do not tell the story," he continued. "Improvement in quality, in strength, ductility, durability, and tolerances has enabled fabricators to produce their products with lighter sections and greater economy. The price per ton is not the yardstick of steel prices. 'Steel' is a generic word for a thousand products for ten thousand uses.

"By reason of size are these things made possible."

In speaking of steel prices, Mr. Irvin pointed out that wages have increased from a 44-cent base rate to a 62½-cent base rate in the major steel centers. Taxes have increased 40 per cent.

The Irvin works, and others like it, said Mr. Irvin, add to the security of America.

"Its location in the heart of the country fortifies its safety in time of trial. Its size and efficiency are reassuring elements in any situation which may arise.

"Though constructed for peacetime work and the advancement of better living, which all of us hope will never again be interrupted, nevertheless this modern plant is part of the defensive strength of our country. As such, all America should wecome its completion."

Enders M. Voorhees, chairman of the Steel corporation's finance committee, termed the mill as "probably one of the most modern displays of man's developed control over the basic elements."

Earnings Must Pay for Mill

"In considering the meaning and promise of our latest development in this famous iron and steel center, I am ever mindful, in line with my principal responsibility and trust, of the great investment of capital in this project, and the important considerations leading to that investment.

"This capital outlay must be repaid through earnings from operations, a portion of the profits going to stockholders, and the remainder being available for investment in greater and better mills for the future. In the uninterrupted continuance of this investment cycle, lies the hope, not only for the owners of this particular mill, but also for America, for you, for me and for each one who labors.

Presiding at the banquet was J. Lester Perry, president, Carnegie-Illinois, who welcomed the visitors on behalf of United States Steel Corp. and Carnegie-Illinois.

"One great satisfaction that comes with accomplishment," he said, "is the sharing of that accomplishment with our friends and associates."

Detailed description of the Irvin works will be found beginning on page 40, this issue.

Awards Bethlehem Three Cargo-Passenger Ships

■ Contract for building three combination cargo-passenger ships was awarded to Bethlehem Steel Co. last week by the maritime commission. The ships, which will cost $3,218,000 each, a total of $9,654,000, will be built at Bethlehem's Sparrows Point, Md., plant.

The ships placed last week brings the total ordered by the commission this year to 50, conforming to its policy of building 50 each year for the next ten years to replace obsolete merchant marine tonnage.

Each of the three new ships will be 490 feet long, with 65-foot beam, 16½-knot speed, and will accommodate 63 passengers. They will be built for the account of the Mississippi Shipping Co., New Orleans, and will be placed in the Gulf-East coast of South America service.

AVIATION

PRODUCTION OF MILITARY AIRCRAFT UP 95 PER CENT

■ AIRCRAFT production in the United States during the first nine months this year increased 4 per cent over the same period in 1937, according to the civil aeronautics authority. Although 28 per cent fewer planes were built for domestic civil use, production for military service advanced 95 per cent and for export 36 per cent.

Of 2873 planes, 1313 were for civil use, 944 for military and 616 for export. Last year, of 2757 aircraft there were 1821 civil, 484 military and 452 export.

ARMY AWARDS 74-PLANE ORDER TO NORTH AMERICAN

North American Aviation Inc., Inglewood, Calif., has been awarded a $2,346,128 contract by the war department for 74 single-engined observation planes. Fifty will go to the national guard while 24 are for the army air service.

This contract increases the company's backlog to more than $17,000,000. Sales deliveries during 1938 are estimated at $10,000,000, an all-time record, compared with $3,469,735 last year.

FINANCIAL

■ SUPERIOR STEEL CORP., Pittsburgh, has arranged a bank loan of $500,000, in addition to the private sale of a mortgage of $1,250,000. Proceeds were used to retire $816,000 of first mortgage 6 per cent sinking fund bonds, due Dec. 15.

♦

Republic Steel Corp., Cleveland, has taken no action with respect to payment of dividends Jan. 1, 1939 on the 6 per cent cumulative convertible prior preference stock, Series A, and on the 6 per cent cumulative convertible preferred stock.

♦

Laclede Steel Co., St. Louis, has declared a dividend of 15 cents a share on capital stock, bringing total dividends this year to $2 a share.

Twenty-Five Years of Stainless Steel; Plan for Standardization Outlined

■ LEADERS of the stainless steel industry and their guests numbering 111 celebrated the twenty-fifth anniversary of the discovery of stainless steel at a formal banquet at the Duquesne club, Pittsburgh, Tuesday night, Dec. 13.

Benjamin F. Fairless, president, United States Steel Corp., was introduced as toastmaster by Raoul E. Desvernine, president, Crucible Steel Co. of America.

The program was devoted largely to recounting the history of stainless steel and predictions as to its future. Speakers included Dr. V. N. Krivobok, associate director of research, Allegheny-Ludlum Steel Corp., Pittsburgh; L. S. Bergen, associate director of metallurgy and research, Crucible Steel Co. of America, Pittsburgh; and John H. Van Deventer, editor, *The Iron Age*, New York.

Adjoining rooms contained a display of products made from stainless steel; many of the accessories at the banquet tables such as ash trays and decorations were of this material. Highlight of the entertainment was singing by the Stainless Steel Men's chorus, organized for the occasion by the National Broadcasting Co. The program was summarized in a radio broadcast over that network.

Mr. Bergen's address, "Standardization of Stainless Alloys," laid down a program for simplification of the number of stainless steels now being produced.

"The purpose is not an attempt to eliminate types of obvious uses," he said. "However, the industry's imposing list of alloys has been viewed with a critical eye in an effort to consolidate familiar overlapping types into a single type, eliminate nonessential types and retain those types which have proven satisfactory in their present form."

The first and major problem, he declared, is to clarify the status of the steels of widest application—the general purpose chromium-nickel corrosion-resisting alloys commonly referred to by the term "18-8."

Wide Variety of Applications

These are the steels which serve a wide field in dairy, food handling, beverage dispensing, architectural, automotive, naval, chemical and other applications.

"No one type," he stated, "is suitable for all these applications. The types best suited for one industry are sometimes found more expensive to manufacture than a type which is satisfactory for another application or another industry."

He recommended that the present seven types be arranged into four general groups identified by carbon content and maximum percentage of chromium and nickel. The free-machining type should remain as now established with only a slight modification of chromium content. He further pointed out that the use of scale resisting chromium-nickel steels possessing great strength at high temperatures is increasing and that it is desirable to retain those types falling into present general categories.

Likewise worthy of being retained, he said, are the special corrosion-resisting steels, particularly those used in reducing acids. The essentially straight chromium steels he grouped into three general classifications: (1) The hardenable pearlitic steels; (2) the hard cutlery and ball-bearing steels, and (3) the ferritic chromium steels widely used in heat and scale resisting applications where maximum strength at high temperatures is not required.

Those in the first group, he added, should be retained essentially in their present form with the exception that carbon should be increased to allow greater hardenability and strength, thereby widening the field of application.

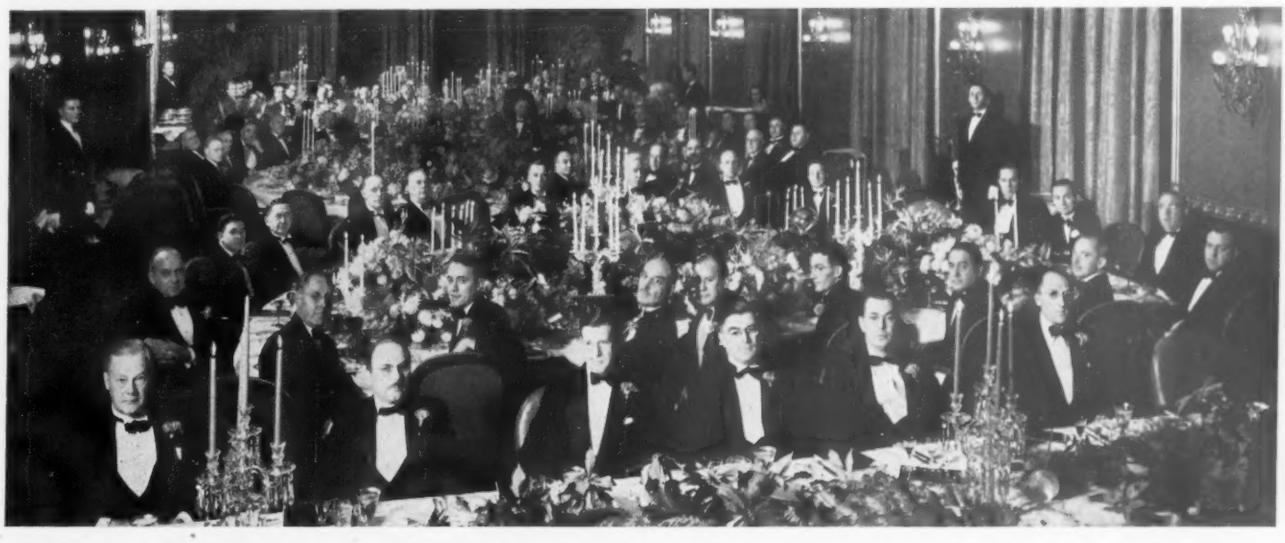
The stainless cutlery types would be left unchanged, and the ferritic chromium steels maintained intact, with the exception of one type containing 17 per cent chromium, 1 per cent silicon and 1 per cent copper. This, he said, should be eliminated "as it is felt that applications for which this type has been used can be adequately served by the straight 17 per cent chromium type."

Need Standards for Finishes

Widespread confusion exists in the matter of finishes on sheets and strip, and effective standards are practically nonexistent, he declared.

"When a consumer orders a No. 3 finish from two different producers he frequently finds it impossible to match the two products, and the same situation exists in the No. 2 finish where different degrees of mechanical surface treatment are being applied just prior to the final cold pass."

He recommended that on the No. 2 finish no mechanical surface treatment be applied after the last anneal and pickle, preceding the final cold pass. He recommended immediate



■ **Tribute was paid to the discoverers of stainless steel at the dinner in the Duquesne club, Pittsburgh, Tuesday, Dec. 13. Broader and more effective uses also were discussed. Candelabra and other table decorations were of stainless steel**

elimination of the No. 3 and other so-called intermediate finishes.

Mr. Bergen paid tribute to the following metallurgists for whom he said he was acting merely as spokesman: V. B. Browne, Allegheny-Ludlum Steel Corp.; E. P. Johnson, Republic Steel Corp.; T. F. Olt, American Rolling Mill Co.; and R. E. Zimmerman, United States Steel Corp.

"In an industry," he concluded, "where the development of new uses is so important and misapplications result not only in costly claims but in seriously retarding progress, it might be well to even further encourage the liberal co-operation of the industry's metallurgists in all new developments, in order to settle the differences of opinion which frequently exist among these men. Conflicting recommendations to a prospective consumer might thus be eliminated."

From the examination of available records, said Dr. Krivobok in his address "Origin and Development of Stainless Steel," it is evident that two men, Harry Brearley of England and Elwood Haynes in the United States, were responsible for inaugurating the era of chromium bearing stainless steel.

German Conceived Nickel Alloy

"To these two distinguished names," he said, "should be added a third, that of Dr. Benno Strauss of Germany, because almost simultaneously with Brearley and Haynes, Strauss conceived an alloy containing not only iron and chromium but also nickel." The three men, he declared, however, had one thing in common—their inventions all emphasized the stainless properties of alloys.

The speaker traced in detail the development of present-day stainless, from the first chisels made by Haynes in 1911—which were laid away under the family sofa—the knives sent by a representative of International Silver Co. from Thomas Firth & Sons, Sheffield, England, to his company in Connecticut with the notation: "I have cut up a lemon with this knife before posting it so that lemon juice will be on the knife when you receive it which can be washed off with warm water and you will find the blade is still bright"; and so on to the wide variety and manifold improvements of today.

Tribute also was paid by Dr. Krivobok to the "time-honored selling profession" which, he said, "had to overcome usual and natural suspicion toward new, and in a sense, revolutionary developments."

Mr. Van Deventer outlined "Commercial Aspects of Stainless." He predicted that "with its brakes released" the industry by 1947 should look forward to crossing the million-ton mark in annual ingot production. This year, he said, it probably will chalk up an output of less than 100,000 tons.

"It is during the period of adolescence or expansion such as you are now in that an industry gets its growth," he said. "It is that period which determines very largely the soundness and stature of the industry at maturity. It is important that an industry during this period shall have the proper environment and be fed the proper growth vitamins. Otherwise you may find a dwarf where you should have a giant.

"Sometimes it is better for a new industry not to have too many uncles and aunts to prescribe its diet and teach it manners. The development of aluminum, I think, showed the efficiency of unified control."

Those who attended: G. F. Ahlbrant, R. M. Allen, P. A. E. Armstrong, H. G. Batcheller, F. M. Becket, J. K. Beeson, L. S. Bergen, W. G. Blume, Bruce Borland, C. B. Boyne, S. A. Brailey, V. B. Browne, Mr. Burns, J. P. Butterfield, J. J. Campbell, Thomas Campbell, D. B. Carson, Joseph Carter, R. E. Christie, D. G. Clark, E. B. Cleborne, R. E. Desvernine, W. F. Detwiler, Ralph DeVries, J. A. Downey, H. S. Downing, W. P. Ewing.

B. F. Fairless, Walter Farnsworth, Arthur R. Friedman, A. N. Flora, F. R. Frost, A. T. Galbraith, Frank Garrett, D. J. Giles, W. A. Givens, J. D. Glenn, Julian Gordon, Bert Goss, Richard Gridley, C. W. Guttzeit, B. J. Harris, R. L. Hartford, Stuart Hazelwood, H. H. Howard, F. B. Hufnagel, J. M. Hughes, P. C. Huntley.

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Utility Plant Expansion To Cost $3,600,000

■ Consolidated Gas, Electric Light & Power Co., Baltimore, announces it will spend $3,600,000 before 1940 for additional generating capacity at its Westport, Md., plant in anticipation of growing power demand.

A 33,000-horsepower steam turbine and auxiliary equipment will be installed by General Electric Co., Schenectady, N. Y., to supplement the station's present 211,000-horsepower capacity. Two steam generating units, each producing 315,000 pounds per hour, are to be supplied by Combustion Engineering Co. Inc. Equipment will be housed in a steel and concrete building to be erected adjoining the present plant.

All Houses of Steel in Attractive Village

■ All arc-welded steel houses mark a step ahead in real estate subdivisions. Edgehill village, a steel house settlement being developed by Hobart Bros., Troy, O., shows the attractive possibilities of such construction. Not a bit of wood is used in any of these houses. They are built complete in the Hobart factcry and moved to the site on trucks

1938 Building Best Since 1930

■ CONSTRUCTION activity for 1938 will aggregate approximately $8,800,000,000, the largest total in any year since 1930, estimates the bureau of foreign and domestic commerce.

The increase over the estimated total of $8,675,000,000 for 1937 was caused by a $540,000,000 gain in public construction, more than offsetting the decline in private work. The totals include not only new construction but also maintenance and work-relief construction.

New construction activity, not including maintenance and work-relief, declined slightly from $5,340,000,000 in 1937 to $5,200,000,000 in 1938; however, it was more than twice the 1933 figure.

This category of construction averaged $9,000,000,000 annually in the ten years ended in 1929 and attained a peak of $10,948,000,000 in 1927.

Private residential construction declined in 1938 more than $100,000,000 to $1,285,000,000, and constituted but 25 per cent of all new construction as compared with an average of about 40 per cent in the decade of the 1920's.

Primarily as a result of a one-third drop in factory building in 1938, total private nonresidential construction declined from $894,000,000 to $745,000,000. Public utility companies spent approximately 20 per cent less for new construction in 1938 than in the preceding year.

New public construction, excluding federal work-relief building, by the federal government was $1,310,000,000 in 1938. Work-relief construction under the works progress administration is estimated at $1,000,000,000 for 1938, a considerable increase over 1937.

Bethlehem To Sell Homes to Employes

■ Bethlehem Steel Co. will sell almost the entire Bethlehem park, near its Lackawanna, N. Y., plant to employes within the next year. The section comprises 258 homes, valued at more than $540,000; individual home values range from $1685 to $2660.

Henry H. Sylvester, Bethlehem's superintendent of real estate and housing at Lackawanna, said the houses will be offered for a limited time to present tenants at approximately one-half their cost.

Federal financing will not be required. Tenants unable to make the down payment are accorded the privilege of paying 40 per cent on purchase and 20 per cent of the down payment each month. If by April the purchaser is unable to continue the contract, the down payment will be refunded.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Dec. 17	Change	Same week 1937	1936
Pittsburgh	41	— 2	19	80
Chicago	60	+ 0.5	24	77
Eastern Pa.	37	None	29	50.5
Youngstown	56	— 9	30	79
Wheeling	62	None	24	92
Cleveland	59	— 7.5	36	78
Buffalo	44	— 5	16	84
Birmingham	82	+ 7	45	76
New England	70	—10	30	77
Cincinnati	75	None	54	96
St. Louis	51.5	None	16	80
Detroit	89	+ 3	52	95
Average	58	— 3	27	79.5

November Machine Tool Orders Off 5 Per Cent

■ Decrease in foreign orders caused the National Machine Tool Builders' association's November index to recede 6.1 points, or 5 per cent, to 112.2. This is 8.7 points under the August index, 120.9, the highest point of the year to date.

Domestic business was slightly stronger in November, making that month the best of the year for domestic volume. The three months' average or trend is down slightly.

Steel Corp. Shipments Larger in November

■ Finished steel shipments by United States Steel Corp. in November were 679,653 tons, an increase of 16,366 tons, 2.46 per cent, over 663,287 tons shipped in October and 92,412 tons, 15.73 per cent, over 587,241 tons in November, 1937. For 11 months the total is 5,931,164 tons, compared with 12,336,394 tons in the same period, 1937.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1938	1937	1936	1935
Jan.	518,322	1,149,918	721,414	534,055
Feb.	474,723	1,133,724	676,315	583,137
Mar.	572,199	1,414,399	783,552	668,056
April	501,972	1,343,644	979,907	591,728
May	465,081	1,304,039	984,097	598,915
June	478,057	1,268,550	886,065	578,108
July	441,570	1,186,752	950,851	547,794
Aug.	558,634	1,107,858	923,703	624,497
Sept.	577,666	1,047,962	961,803	614,933
Oct.	663,287	792,310	1,007,417	686,741
Nov.	679,653	587,241	882,643	681,830
11 mo.	5,931,164	12,336,394	9,757,767	6,709,794
Dec.	.....	489,070	1,067,365	661,515
Y'rly adj.	....	†77,113	†40,859	†23,750
Total	.....	12,748,354	10,784,273	7,347,549

†Deduction.

PRODUCTION

■ STEELWORKS operations last week increased in three producing districts, declined in five and were unchanged in four. The national rate is estimated at 58 per cent, 3 points lower.

Cleveland—Declined 7.5 points to 59 per cent as two interests took off one open hearth each. Prospects are for a slight increase this week. Republic Steel Corp. increased production from 21 per cent in June to 67 per cent in December, employment rising from 37,000 to 48,000.

Youngstown, O.—Averaged 56 per cent, a decline of 9 points. The week started at 58 per cent and closed at 55 per cent, with 49 open hearths and two bessemers active. For this week a drop to 43 per cent is indicated.

Pittsburgh—Net loss of 2 points to 41 per cent followed various changes in schedules.

Wheeling—Held at 62 per cent for the third consecutive week.

Detroit—Advanced 3 points to 89 per cent on addition of another open hearth.

Buffalo—Loss of 5 points to 44 per cent followed cooling of two open hearths by a leading producer.

Cincinnati—Steady at 75 per cent for the third consecutive week.

St. Louis—Unchanged at 51.5 per cent, with 17 out of 33 open hearths in production for the third week.

Birmingham, Ala.—Increased 7 points to 82 per cent. Republic Steel Corp. added its sixth open hearth, making 18 furnaces active.

New England—Down 10 points to 70 per cent, two steelworks curtailing slightly.

Central eastern seaboard—Unchanged at 37 per cent. A moderate decline is scheduled this week.

Chicago—Slight adjustments by various producers resulted in a net increase of one-half point to 60 per cent, equal to the year's high.

Steel Mills Create 21 Per Cent of Rail Freight

■ One out of every five tons of freight hauled by American railroads in 1937 represented shipments of raw materials to plants of the steel industry or shipments of finished products from steel mills, the American Iron and Steel institute reports.

The industry's raw materials and finished products represented nearly 212,000,000 net tons of railroad freight during the year, or 21 per cent of the total of 998,398,000 tons hauled by Class I railroads.

MEN OF INDUSTRY

■ WALTER H. STEWART has been appointed manager of sales, reinforcing products division, Truscon Steel Co., Youngstown, O. He formerly was St. Louis district sales manager from January, 1936, to September, 1938. A graduate of Ohio university, he was associated with the engineering department of Truscon, 1924-25; Truscon Miami, Fla., office, 1926; chief engineer, Jacksonville office, 1927; chief engineer, Detroit office to January, 1931; district sales manager, Birmingham office to January, 1936.

R. H. Sartor, formerly manager of sales, Crittall-Federal Co., Waukesha, Wis., has become manager of sales of Truscon's steel window and door division, Youngstown. Following graduation from Purdue in 1907, he became acting chief engineer, Panama railroad, Panama Canal Zone. From 1920 to 1929 he was with Truscon's New York district sales office as manager of sash sales, and from 1929 to 1938 was commissioner, Metal Window institute, Washington.

C. B. McGehee, since 1936 district sales manager of Truscon's Dallas, Tex., office, has been transferred to Youngstown as manager of sales, highway products division. Mr. McGehee joined the Atlanta, Ga., office of Truscon in 1928 as chief engineer, and from 1930 to 1936 served as district sales manager there.

♦

R. H. McGredy, for many years a sales executive, Harnischfeger Corp., Milwaukee, has been appointed manager of the company's Washington office.

♦

Salem C. Pohlman has been named general manager, California Wire Cloth Corp., Oakland, Calif., a subsidiary of the Colorado Fuel & Iron Corp.

♦

J. E. Muller, manager, New York, Albany and Cambridge divisions, Wheeling Corrugating Co., has resigned. Mr. Muller's plans, for the present, are unknown.

♦

George Seyler has been elected president, Cincinnati Industrial association, Cincinnati. Other newly-elected officers are: Vice president, W. L. McGrath; treasurer, E. A. Foy; secretary, W. H. Wuerdeman.

♦

Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J., has been re-elected president, New Jersey chapter, Institute of Scrap Iron and Steel Inc. Other officers are: First vice president, W. Abramson, A. Abramson & Sons Inc., Newark, N. J.; second vice president, Israel Citron, Citron-Byer Co., Trenton, N. J.; third vice president, Howard Isaac, Abraham Isaac Inc., Elizabeth, N. J.; secretary-treasurer, Murray Kunin, Schiavone-Bonomo Corp., Jersey City, N. J.

W. H. Stewart

R. H. Sartor

C. B. McGehee

♦

Benjamin W. Ashmead, the past five years statistician of the metals and minerals division, department of commerce, Washington, has resigned to take up similar work for the civil aeronautic authority.

♦

W. J. O'Neil, vice president and general manager, Dodge Bros. Corp., Detroit, has become president, succeeding K. T. Keller, who held the Dodge presidency as well as that of Chrysler.

♦

Ray J. Reed, general manager, Titusville, Pa., division of Struthers-Wells-Titusville Corp., has been named sales manager of the Struthers-Wells division, with headquarters in Warren, Pa.

♦

Frank P. Snyder, formerly sales engineer, De Vilbiss Co., has become sales representative in the Detroit area for the Alexander Milburn Co., Baltimore, manufacturer of spray finishing equipment and cutting and welding apparatus.

♦

A. Clinton Decker, sanitary engineer, Tennessee Coal, Iron & Railroad Co., Birmingham, has been appointed a member of the executive committee, sanitary engineering division, American Society of Civil Engineers.

♦

Earl P. Ordway, vice president and chief engineer, has been elected president, Union Steam Pump Co., Battle Creek, Mich. He succeeds C. W. Brainerd, resigned. Mr. Ordway has been with the company 31 years.

♦

Glenn Griswold recently resigned as publisher of *Business Week,* to establish the industrial public relations firm of Glenn Griswold Associates, with headquarters at 330 West Forty-second street, New York, and a branch office at 520 North Michigan avenue, Chicago.

♦

O. E. Quinton has been appointed director of sales, Hanson Excavator Works, division of the Hanson Clutch & Machinery Co., Tiffin, O., with headquarters at 224 South Michigan avenue, Chicago, where the company recently opened an office.

♦

Carnegie-Illinois Steel Corp., Pittsburgh, announces the following appointments at its Duquesne, Pa., works: Russell O. Hunt, assistant superintendent, rolling mill, in charge of steel preparation; Dennis A. Crowley, assistant chief metallurgist in charge of inspection and testing; Edward J. Chelius, assist-

ant to open-hearth department superintendent in charge of electric furnace steel production.

♦

G. Clifford Livezey, formerly with W. S. Hurst & Co., certified public accounting and industrial engineering firm, has been elected president and general manager, Metals Coating Co. of America, Philadelphia. Charles H. Atherholt has been elected vice president.

♦

D. J. Richards, divisional sales manager, E. F. Houghton & Co., Philadelphia, has been appointed manager of steel mill sales, and will retain his headquarters in the Bessemer building, Pittsburgh. A graduate of the University of Pittsburgh, Mr. Richards has had more than 20 years' experience as a supplier to the steel industry while with the Houghton organization and prior to that spent a number of years in steel mill service.

♦

Lloyd E. Arnold has been made manager, Detroit division, P. R. Mallory & Co. Inc., Indianapolis. He has been with the company more than two years, during which time he has been assistant to John B. Tebben, who recently was appointed sales manager, metallurgical division.

♦

Charles T. Ruhf has been elected vice president, Mack Trucks Inc., Long Island City, N. Y., and the Mack Mfg. Corp. He has been a member of the Mack organization since 1912, and since 1937 has been in charge of production of the company's Allentown, Pa., factory. He will continue as chief at Allentown.

♦

Elmer C. Striebel has been appointed Pittsburgh district sales manager and Thomas H. Queer, sales promotion manager, Pittsburgh Coal Co., Pittsburgh. Other appointments include Charles E. Mourer as Cleveland district sales manager, and Ray V. Hunter, Buffalo district sales manager.

♦

V. H. Dearle, associated with Carboloy Co. Inc., Detroit, maker of cemented carbide tools, dies and wheel dressers, since its formation in 1928, has been appointed assistant Detroit district manager. He is a charter member, American Society of Tool Engineers, and has been connected with the tool industry in Detroit over 30 years.

♦

W. K. Hyslop, formerly European manager, Massey-Harris Co., Racine, Wis., maker of tractors and farm implements, with headquarters in Marquette, France, has been appointed general manager of the company's American and Canadian

D. J. Richards

business. He succeeds O. H. Shenstone, who has been promoted to vice president.

♦

M. E. Dodge, a former sales engineer with Wilson-Brown Inc., New York, is now in business for himself, representing Kingsland & Co. Inc., Newark, N. J., maker of sheet metal tools and equipment. He will also sell Ohio shear blades, brake dies and machine tools. His headquarters are at 136 Liberty street, New York.

♦

Harry Braman, Charles B. Braman & Sons Inc., Chicago, has been elected president, Scrap Metal Institute of Chicago. Other officers are: Vice president, Joseph Shore, Liberty Metal Corp.; secretary, Nathan Freedman, Atlas Metal Co.; treasurer, Morris S. Cohen, L. S. Cohen & Co.; general counsel and executive director, Benjamin Robert Cohen.

♦

John J. Golden, since Oct. 1, 1935, superintendent of the No. 2 open hearth, South works, Carnegie-Illinois Steel Corp., has been transferred to the Gary works as superintendent of steel production. He

John J. Golden

succeeds A. W. Slater, resigned. He began his association with the corporation in 1911 as an office boy at the South Chicago plant, subsequently becoming relief foreman, stock foreman, general relining foreman and assistant superintendent of the various open hearths.

♦

Ira Gribben will retire Jan. 1 as assistant to the manager, Pittsburgh district, American Steel & Wire Co., after 40 years' continuous service. Mr. Gribben started working for the Wire company in June, 1898, as sales ledger clerk, in the Pittsburgh office. In November, 1937, all industrial relations activities of the Pittsburgh district were brought under one office, with Mr. Gribben in charge and on June 1, 1938, he was appointed to his present position.

♦

Edmund A. Prentis, Spencer, White & Prentis, New York, has been elected president, American Standards association, New York. Other officers chosen are: Vice president, R. E. Zimmerman, vice president, United States Steel Corp.; chairman, standards council, F. M. Farmer, vice president, Electrical Testing Laboratories, New York; vice chairman, standards council, R. P. Anderson, American Petroleum institute, New York.

♦

Ed Stein, United Iron & Metal Co., Canton, O., has been re-elected president, northern Ohio chapter, Institute of Scrap Iron and Steel Inc. Max Friedman, Max Friedman Co., Cleveland, has been re-elected first vice president; E. A. Schwarzenberg, E. A. Schwarzenberg Co., Cleveland, re-elected second vice president; Jack Levand, Summer & Co., Cleveland, secretary, and Ben L. Newman, Luntz Iron & Steel Co., Cleveland, treasurer.

♦

Walter B. Strong, formerly manager, export division, Worthington Pump & Machinery Corp., Harrison, N. J., has been named assistant general sales manager. He will, however, continue general supervision of export sales and will also be identified with certain phases of domestic sales work. He has been a member of the Worthington organization since 1920.

George Gellhorn Jr. will succeed Mr. Strong as manager, export division.

♦

E. K. Waldschmidt, formerly metallurgical representative in the Detroit area for Jones & Laughlin Steel Corp., Pittsburgh, has been appointed assistant metallurgist, Pittsburgh works, succeeding A. A. Archibald, who has been transferred

(*Please turn to Page* 27)

HUMAN FINGERS MECHANICAL HANDS

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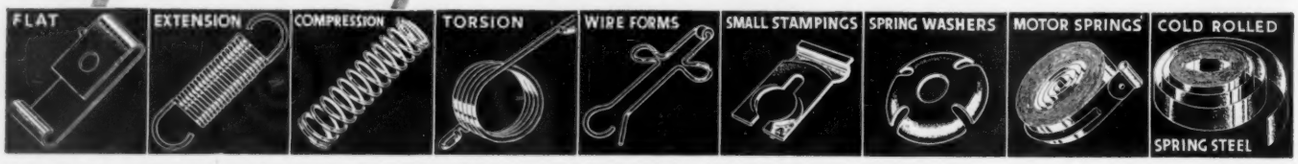
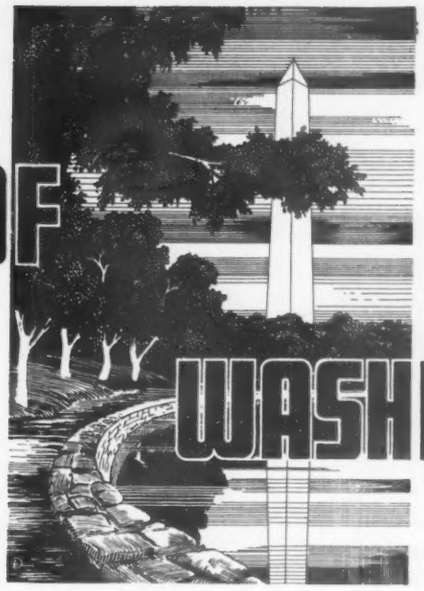


SPRINGMAKERS FOR MORE THAN THREE QUARTERS OF A CENTURY

WINDOWS OF WASHINGTON



BY L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ CHARLES V. McLAUGHLIN, assistant secretary of labor, will have charge of the oral arguments to be held here Dec. 20 "to assist on the evidence of record and the recommendations of the public contracts board in the determination of the prevailing minimum wage in the iron and steel industry."

It is understood at the labor department that members of the contracts board may "sit in" at the arguments if they desire, but they will not participate actively.

L. Metcalfe Walling, administrator of the contracts law, announced the oral arguments had been granted and that the time allotted to each interested party for argument will be determined on the basis of appearances filed. In no event will more than one hour be allotted to each party. Arguments must be limited to evidence now on record.

Appearances for the oral arguments must be filed on or before Dec. 19. Time for filing briefs has been postponed from Dec. 10 to Dec. 19.

Additional briefs and statements were filed with the board last week. These included a statement from Wilbert Wear, Harrisburg Steel Corp., Harrisburg, Pa., who asked for reconsideration of the board's decision and said in his opinion differentials should be recognized.

Asks 56½-Cent Rate

Alan Wood Steel Co., Conshohocken, Pa., filed a statement objecting to the board's report and asserting a rate of 56½ cents should be applied to the eastern section of Pennsylvania.

Worcester Pressed Steel Co., Worcester, Mass., protested the 62½-cent rate on small company basis and freight rate differentials, which tends to localize its market.

Seneca Wire & Mfg. Co., Fostoria, O., protested the recommended rate on the basis of size. The company believes the nonintegrated character of small firms calls for special consideration.

Andrews Steel Co. Newport, Ky., stated that it would be a detriment to public welfare for the secretary of labor to adopt the majority report.

Other statements filed included: United States Steel Corp., Associated Industries of Massachusetts, Cohoes Rolling Mill Co., Cohoes, N. Y.; Inland Steel Co., Chicago; Parkersburg Iron & Steel Co., Parkersburg, W. Va.; Laclede Steel Co., St. Louis; Sheffield Steel Corp., Kansas City, Mo.; Calumet Steel Division, Borg-Warner Co., Chicago; Kansas City chamber of commerce, Kansas City, Mo.; and Franklin Steel Works, Franklin, Pa.

SAYS TAX CREDITS WOULD INCREASE RAIL SPENDING

The senate finance subcommittee has completed hearings on profit-sharing and will draft a report to be submitted to the senate.

R. V. Fletcher, general counsel, Association of American Railroads, told the committee the railroads might spend a billion dollars a year for improvement if federal and state taxes were lightened. He said the carriers would need to spend that amount for ten years to bring equipment completely up to date. Such expenditure, he contended, would give 500,000 jobs to persons in heavy industries.

Mr. Fletcher said he believed it would be a good thing if the government would provide some incentive in the form of tax reductions in return for railroad expenditures on rehabilitation.

"I think," Mr. Fletcher said, "that if the railroads could have continued to buy as much material and supplies during the depression as they purchased from 1923 to 1929, there would have been no necessity for the huge expenditures that have been made for relief."

Alfred P. Sloan Jr., chairman, General Motors Corp., told the committee profit-sharing "is not applicable as a broad procedure simply because outside of a limited number of special cases that always arise, there are not sufficient profits to apply an equitable formula and mean anything consequential to the worker, except, perhaps, in limited periods of prosperity."

Mr. Sloan said further that "our experience in General Motors has taught us the best plan is the biggest pay envelope that is possible, under any particular circumstances, supported by the maximum possible protection against the business cycle, the seasonal trend and incapacity to work due to the vicissitudes of life. Anything that can be done in the way of promoting those general objectives, from the tax incentive principle, is both socially and economically desirable.

"When it comes to tax incentive as a principle, in the abstract, I am of the opinion that it is impossible to take a position for or against it. Each proposal must be considered not only as to itself, but as to its method of application. Any plan should contemplate a broad application along the industrial front. Otherwise it prejudices the competitive setup and may become a penalty, in some instances, even if it is an incentive in others. If the application is very limited, it becomes a subsidy, and that is highly undesirable."

PRESIDENT WILL PUSH REORGANIZATION BILL

The President announced last week he will insist on enactment of the government reorganization program which was badly defeated

last session. The President also is discussing with his tax experts a new tax program, the armament proposals and neutrality law amendment.

Main proposals in the reorganization program: Authority for the President to revamp and regroup various administrative agencies (with exceptions), with his changes to become effective after a 60-day period.

Creation of a department of public welfare—another agency of cabinet rank—under which all welfare agencies of the government would be grouped.

Provision for six executive assistants to the President to take care of some of the work which falls to the Chief Executive.

Abolition of the civil service commission and the appointment of an administrator.

Abolition of the general accounting office and the comptroller-general who heads it and the setting up of an auditor general.

INDUSTRIAL ECONOMICS BUREAU AGAIN PROPOSED

An interesting story is heard around Washington on possible establishment of a bureau of industrial economics—not a new subject by any means. However, there is a new angle to it.

Some who claim to be in the inner circle of the administration think it would be a good idea to establish such a bureau.

One young New Dealer believes such a bureau could collect a lot of valuable information and possibly alsc carry on the investigative work now being done by the economic committee. He proposes to set up a bureau in one of the existing departments and then get an appropriation to allow professors in the land grant colleges to collect information in their respective states and forward it to Washington.

So far, the idea has not progressed beyond the thinking stage.

There are some thorns in the idea. For instance, Leon Henderson, executive secretary of the economic committee, wants to head the bureau. Also the federal trade commission and the department of commerce are both fighting to get hold of it.

Some government officials believe such a bureau would be to industry what the bureau of agriculture now is to the farmers.

EXPORT GROUP STUDIES FINANCING FACILITIES

An export group has recently been organized by the American Road Builders' association. Included is a bank committee composed of Paul Weeks, J. J. Kennedy, Charles M. Upham, and Lewis M. Lind. This group recently met in Washington to make a preliminary study of export financing facilities available to United States equipment builders and of comparable aid furnished to foreign traders of other countries.

It is understood the committee found at least 16 European governments have undertaken export promotion through different kinds of procedures with varying degrees of success and upon scales of operations which have ranged from a few hundred thousands to reportedly hundreds of millions of dollars a year.

LITTLE BUSINESSMAN HITS GUARANTEED LOAN PROPOSAL

The reported plan for government guarantee of bank loans to business and industry, along the lines of FHA guaranteed mortgage loans, will not meet the credit needs of the small independent, says George Olmsted, Des Moines, Iowa, chairman of the American Federation of Little Business.

"We already have in operation what is, in effect, an insured loan program, but it is not producing the desired results," Mr. Olmsted said. "The RFC stands ready to take up to 90 per cent of industrial and business loans made by banks. And yet, according to Jesse Jones, chairman of the RFC, only about one bank in 14 has indicated willingness to participate in this program.

"This is not primarily the fault of the banks themselves, for they are not set up or prepared to make long-term loans. An ordinary commercial bank, accepting demand deposits, is usually in no position to make even 10 per cent of any considerable volume of five, seven, or ten-year loans. Consequently, any insured loan program based on the FHA model is doomed to failure for the same reason that is probably back of the reluctance of banks to co-operate with the RFC."

GOVERNMENT STEEL AWARDS TOTAL $827,508.32

During the week ended Dec. 10, the government made awards on iron, steel and their products amounting to $827,508.32. These awards were made under the Walsh-Healey act as follows: Bolt & Nut division, Republic Steel Corp., Cleveland, $26,992.43; The Tredegar Co., Richmond, Va., $16,804.50; The Midvale Co., Philadelphia, $161,794.65; The Heppenstall Co., Pittsburgh, $61,530.75; The Midvale Co., Philadelphia, $37,788; Lynchburg Foundry Co., Chicago, $11,409.20; Alabama Pipe Co., Chicago, $17,162.75; Bethlehem Steel Co., Bethlehem, Pa., $14,613.94; Carnegie-Illinois Steel Corp., Washington, $18,300; Colorado Fuel & Iron Corp., Denver, $15,990; Central Iron & Steel Co., Harrisburg, Pa., $310,000; Philadelphia Gear Works, Philadelphia, $17,550; Central Iron & Steel Co., Harrisburg, Pa., $42,350; Carnegie-Illinois Steel Corp., Washington, $46,000; Bethlehem Fabricators Inc., New York, $17,022.10; and Somaron Sheet Metal Works Inc., Bronx, N. Y., $12,200.

ROPER RESIGNS COMMERCE DEPARTMENT SECRETARYSHIP

Daniel C. Roper, secretary of commerce since the beginning of the Roosevelt administration, resigned last week, effective Dec. 23.

His resignation has been expected for months, even years. Many times he has not been in accord with the New Deal policies.

Mr. Roper announced he resigned to take care of his personal business. His son, who had extensive holdings in the South and also managed the Roper estate there, died recently.

Early in his administration, Mr. Roper formed the business advisory council, including about 50 industrialists. Myron C. Taylor, former chairman, United States Steel Corp., once was a member. Edward R. Stettinius, present Steel Corporation chairman, now is a member.

Mentioned as probable successor last week was Harry L. Hopkins, whom, it is said, the President wants to get out of relief work before congress starts an investigation.

Homer S. Cummings previously had announced his retirement from the attorney general's office Jan. 1.

INDUSTRIAL MACHINERY EXPORTS ARE HIGHER

Tabulations by the machinery division, department of commerce, show that during the first ten months this year, industrial machinery exports totaled $225,981,992 compared with $195,999,972 for the same period of last year.

The value of power-driven metalworking machinery exports for the first ten months this year totaled $79,318,856, compared with $46,175,029 for the same period of last year. Of these the value of machinery going to Soviet Russia was $27,153,511 compared with $4,593,505 for a comparable period of last year; to Japan, $19,541,299 compared with $8,018,632 for the same period last year; to the United Kingdom, $12,306,333 compared with $16,030,757 for the same ten months last year.

PERKINS OPPOSES REVISION OF LABOR RELATIONS ACT

"I do not favor revision of the national labor relations act on the basis of my present knowledge," Secretary of Labor Perkins stated last week.

Several times she has placed herself squarely on record as being opposed to any amendment.

"I have been following very closely," she said, "every proposal that has been made for the revision of the labor board act, but do not plan to advance any of my own."

Men of Industry

(*Continued from Page* 23)

to special metallurgical contact work. Mr. Waldschmidt has been associated with Jones & Laughlin's metallurgical department since 1928. He is a member, American Society for Metals and American Welding society.

♦

M. N. Smith, formerly manager, order division, Pittsburgh district, Carnegie-Illinois Steel Corp., has become general manager, order division of the general sales department. J. R. Walker, formerly assistant manager, order division, has been made manager, Pittsburgh order

M. N. Smith

division. J. M. Morehouse, heretofore assistant manager, order division, Chicago district, has been transferred to Pittsburgh as manager, order division, of the general sales department. H. van Zandt continues as manager, Chicago order division.

Mr. Smith has been associated with the organization since 1895, when he began as an office boy. In 1932 he became manager, production bureau, and in 1937 manager, Pittsburgh order division.

DIED:

■ HORACE B. SPACKMAN, 77, retired vice president, Lukens Steel Co., Coatesville, Pa., Dec. 11. Educated at Johnson's academy, Mr. Spackman entered the employ of Huston Penrose & Co. as an office boy. When that company subsequently became Charles Huston & Sons and in 1890 was chartered as the Lukens Iron & Steel Co., Mr. Spackman remained in its service until he retired in 1929.

♦

Fred Frazer, president and principal owner, Frazer & Jones Inc., Syracuse, N. Y., producer of malleable iron castings, Dec. 12. He was one of the pioneer producers of malleable iron castings in the United States.

♦

Frank W. Knowlton, 73, Montreal, Canada, vice president and general manager, United Shoe Machinery Corp., in Montreal, Dec. 9.

♦

Arthur E. Maxim, 68, assistant general manager, State Tool & Cutter Co., Detroit, in that city, Nov. 28.

♦

Harlan E. Snodgrass, 65, formerly president, Newark Tube & Metal Works, Newark, N. J., Dec. 6 at his home in Summit, N. J.

♦

Oscar C. R. Abel, designing engineer, Heil Co., Milwaukee, maker of steel dump bodies for motor trucks and other equipment, in Milwaukee, Dec. 4.

♦

Edward A. Byrne, 74, designer of the Triborough bridge and chief engineer, department of plant and structures, New York city for 17 years, at Rye, N. Y., Dec. 7.

♦

E. D. Crockett, 56, for 30 years New England representative for Henry Prentiss & Co., New York, dealer in metalworking machinery, at his home in Springfield, Mass., Nov. 24.

♦

William G. Langdon, 60, general manager, Automatic Canteen Co., Detroit, in that city, Nov. 22. He formerly was purchasing agent, Michigan Stove Works; general sales manager, Midland Steel Co.; and vice president, Automatic Ball Crank Co., Cincinnati.

♦

William J. Chalmers, 86, retired chairman and co-founder, Allis-Chalmers Mfg. Co., Milwaukee, at his home in Chicago, Dec. 10. Born and educated in Chicago, Mr. Chalmers studied machinery with his father. In 1872 he formed the partnership of Fraser, Chalmers & Co., and in 1891 when this company was consolidated with E. P. Allis Co. as the Allis-Chalmers Mfg. Co. he remained as head until his retirement in 1906.

♦

Percy C. Day, 63, vice president and chief engineer, Falk Corp., Milwaukee, Dec. 7 at his home in Elm Grove, Wis. A prominent figure in the development of gearing, marine and rolling mill equipment, Mr. Day came to this country in 1910 from England, where he had been a power plant engineer, and became associated immediately with the Falk Corp. He was a member, American Gear Manufacturers association, American Society of Naval Engineers and American Society of Naval Architects.

Activities of Steel Users, Makers

■ ALLIS-CHALMERS Mfg. Co., Milwaukee, is completing an $800,000 addition to its La Porte, Ind., works to facilitate the production of a new small harvesting combine for use with the small farm tractor, on which manufacture has been resumed on a large scale at the West Allis plant.

♦

Charles Bond Co., Philadelphia, maker of flexible insulated shaft couplings, has appointed F. Raniville Co., Grand Rapids, Mich., distributor for its line of gears and speed reducers.

♦

Harnischfeger Corp., Milwaukee, has appointed Dixie Mill Supply Co., with offices in New Orleans and Shreveport, La., exclusive agent in Louisiana for its line of electric arc welders and welding electrodes.

♦

Lea Mfg. Co., Waterbury, Conn., has recently become a distributor for the American Cyanamid & Chemical Corp., in the sale of industrial cyanides for use in the electroplating industry.

♦

Mercury Clutch Corp., 621 Western Reserve building, Cleveland, has been organized to manufacture a new type of industrial clutch. J. C. Angel is president, and E. F. Kohl, inventor of the clutch, is chief engineer.

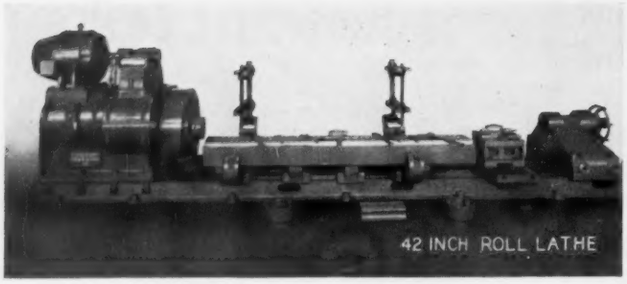
♦

Maremont Automotive Products Inc., Chicago, has purchased the muffler manufacturing equipment of Gem Mfg. Co., Pittsburgh, and will ship it to Chicago where it will be re-tooled for the new Maremont dual-flow muffler design.

♦

Orders for a special 8 x 100-foot rotary cooler, 7 x 30-foot dry-grinding mill and 600-horsepower synchronous motor have been placed by George S. Mepham Corp., East St. Louis, Ill., with Allis-Chalmers Mfg. Co., Milwaukee, for a plant being built at Texarkana, Ark. The plant will use iron ore as a base in production of high-gravity material for oil well drilling.

■ Marting Iron & Steel Co., Ironton, O., is to be dissolved, 86 per cent of stockholders voting for this action. The company has been in process of liquidation for some time and most of its property and assets have been sold. Equipment formerly consisted of three blast furnaces with 320,000 tons annual capacity. Its last stack, at Ironton, was dismantled in 1932.



ROLL LATHES

Our modern heavy duty Roll Lathe built of extremely rugged construction for present day needs. Completely equipped with Timken Bearings throughout and positive circulating oil system.

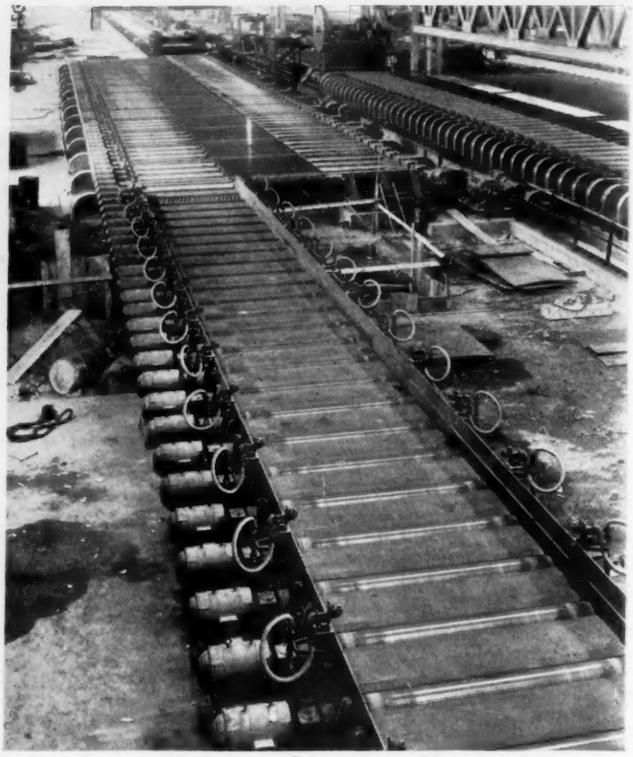
REVOLVING BRUSH SCRUBBER

This high production type of scrubber, operating at speeds of 100 to 300 ft. per minute, employs high speed brush rolls having a longitudinal oscillating motion, eliminating brush streaks . . . All rolls are driven from separate drive box through universal couplings, and are anti-friction bearing equipped . . . Proper arrangement of auxiliary equipment permits this unit to bright pickle, scrub and dry previously wet pickled sheets and strips, or clean, scrub and dry hot rolled sheet and strip in the "as rolled" state or in a pickled, normalized or annealed condition.

• • •

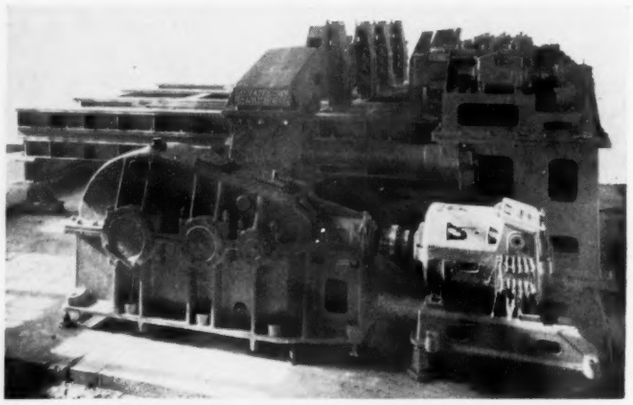
ROLLS
SAND AND CHILLED
SPECIAL ALLOYS

• • •



ROLLER TABLES

Hot plate finish is preserved unscratched because of highly ground, polished rolls and aprons . . . Direct motor or enclosed bevel pinion drives through anti-friction bearings eliminate friction and power loss . . . Welded frames provide maximum rigidity.



DOUBLE FURNACE PUSHER

This represents our latest development in heavy Furnace Pushers for continuous furnaces . . . We build Pushers of all types and for all services.

Also Complete Equipment for

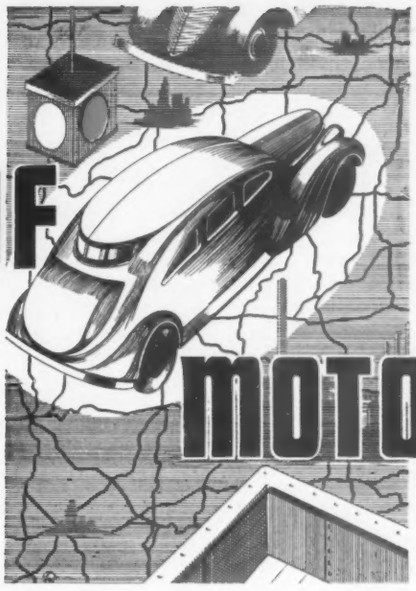
THE FINISHING END OF STRIP MILLS — TIN MILLS AND SHEET MILLS — ROLLING MILL MACHINERY
ROLL LATHES — STRAIGHTENING MACHINES — STRETCHER LEVELERS — SPIKE MACHINES
TUBE MILL EQUIPMENT — SPECIAL MACHINERY — SHEARS

The Youngstown Foundry & Machine Co.

Youngstown, Ohio

FIFTY YEARS OF SERVICE TO THE STEEL INDUSTRY

MIRRORS OF MOTORDOM



DETROIT

■ FIRST signs of weakness in automobile production appeared last week as notices were posted in all Chevrolet plants announcing the work week had been reduced 20 per cent to 32 hours, with Friday closings in effect. Meanwhile, Buick plants at Flint likewise informed employes that, starting Monday, operations would be reduced to four days weekly.

Official explanations of these 20 per cent reductions, which are being placed in effect without any concomitant additions to working forces, are entirely lacking but they appear to be only temporary in view of the fact material and parts releases for the affected plants have not been curtailed proportionately—in fact, releases for January in some cases are even better.

Agitation among members of the UAW in Flint plants probably is the basis for these readjustments in the work week. Union locals announced that unemployed workmen proposed to picket the plants last Friday in the effort to persuade officials to adopt a 32-hour week and expand working forces to absorb them.

Present employes who are members of the UAW declared they would not break through picket lines to go to their jobs Friday, but before any of these threats could mature, announcement of the four-day week was made. However, it is not the apparent intention at present to rehire any more unemployed workmen.

One reason why demands to rehire these men were being pressed so determinedly is that Dec. 17 was the deadline after which men unemployed for the past year lose their seniority, and hence these men —about 6000, it is understood—were doubly anxious to be returned to payrolls before last Saturday.

Actually, the UAW does not favor the 32-hour week unless it can be accompanied by 40 hours' pay, but it saw in the refusal to work over four days a weapon to compel the re-employment of these idle men before they lost their seniority. The weapon proved ineffective, and the temporary winning of a 32-hour week is certainly an empty victory. The motor industry generally is disposed to mark time in labor difficulties until the introduction of a la-

BY A. H. ALLEN
Detroit Editor, STEEL

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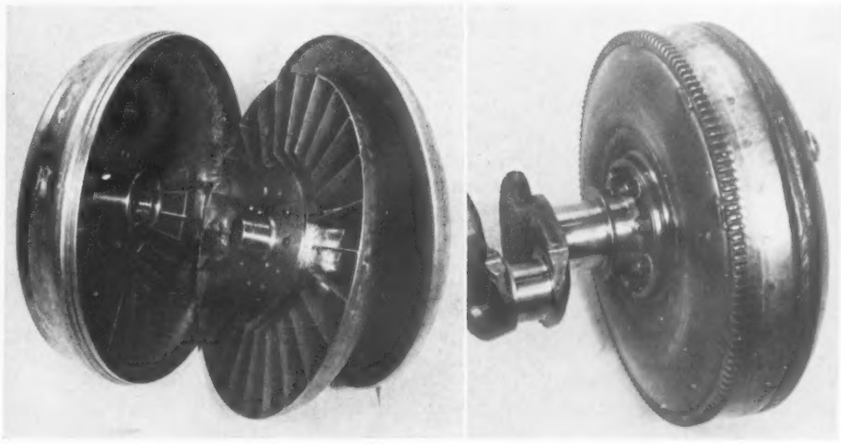
Chrysler Introduces "Fluid Drive" Transmission

■ HERE are assembled and dissembled views of the "fluid drive" unit being used in conjunction with conventional clutch and transmission on Chrysler custom imperial models.

Housing, of stamped cold-rolled steel is attached rigidly to the crankshaft, replacing the conventional flywheel. Inside is a set of 22 radial fins, also cold-rolled steel, welded to the so-called "driver" side of the unit, as shown at the left in the dissembled view. Facing the driver or impeller is a "runner" with 24 blades welded to the shell and riveted to the forged steel hub.

Runner is connected to the driveshaft, but floats in the housing, on ball bearings, the blades being ¼-inch away from the driver blades. The cover plate at the right is welded to the rest of the housing and the assembly nearly filled with a low-pour-point mineral oil. In operation, the driver's rotation sets the oil



in motion and the energy is transmitted to the runner, gradually bringing it up to 99 per cent of the speed of the driver, thus providing a "soft" connection between engine and transmission. Eventually it may be possible to dispense with clutch and transmission altogether, although, of course, provision would have to be made for a reverse gear.

bor relations bill in the state legislature in January by Governor-elect Fitzgerald.

Conferences between the UAW and General Motors were under way late last week on this seniority issue, and it is possible some revision may be made to prevent the 6000 unemployed men from losing their seniority entirely.

Current curtailment may reflect a catching up of production to sales and a rounding out of dealers' inventories, but judging from all figures reported thus far this would not appear to be the case, and the reduction will be only temporary. It is true there has been some shading of output by Hudson, and reports are heard of easing at Packard, but elsewhere the outlook continues bright and production is proceeding full speed.

The usual holiday lull in automobile output will be of small proportions this year. Last year at this juncture many plants were preparing to close until early in January.

Ford Pressing Production

Ford continues to put intensive pressure on production, and by virtue of the customary late start on new models will be booming through the holidays and on into the new year. Assemblies currently approximate 4400 per day—400 Mercurys, 2400 deluxe and 1600 standard models. To this total must be added about 150 Lincoln Zephyrs daily. Lincoln, incidentally, is reported to be discontinuing its senior line of models, and planning to introduce a new custom model built along Zephyr lines in the spring.

Scattered sales reports indicate public preference continues to be shown for the larger or deluxe lines of cars. The above figures for Ford would show this to be the case, and Oldsmobile and Pontiac are finding their deluxe six and eight-cylinder lines far outstripping the new lower-price six models. The inference is that factory workers have not returned to the automobile market in any large numbers, since this class of buyer is considered to be the likely outlet for the standard or low-price models.

■ AS MANUFACTURING demands increase for automobile parts, to meet higher assembly schedules, a tendency is noted to "farm out" more and more production, beyond a certain point. The case of one manufacturer is cited, in which about 30 per cent of steering gear requirements is being awarded to an outside manufacturer, one reason being that the auto manufacturer does not feel justified in building up his working force any further because of the effect such an increase might have on unemployment compensation payments.

This trend is checked by a certain parts manufacturer's representative who, in making a trip through one of the large, local auto plants was asked to look around to see if there were any parts in process which he believed his company could supply.

Thus, in periods of active production, the process of integration of automobile manufacture tends to reverse itself, and more disposition is shown to depend on outside sources for certain parts. Ford, of course, always has kept a close balance between parts produced within the company and those produced outside. Lately the emphasis has been toward further consolidation of manufacturing activities at the Rouge plant, with the new press and body plant, and tool and die shop, but Ford still places a large volume of manufacturing with outside companies.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405,799	376,629	*390,000
11 mos.	4,097,316	4,669,088	*2,248,331
Dec.	518,958	347,349	.....
Year	4,616,274	5,016,437	.....

*Estimated.

Estimated by *Ward's Reports.*

Week ended:	1938	1937†
Nov. 19	96,735	85,757
Nov. 26	84,930	58,955
Dec. 3	97,795	86,848
Dec. 10	100,705	85,765
Dec. 17	102,905	82,025

†Comparable week.

	Week ended Dec. 17	Week ended Dec. 10
General Motors	44,125	41,840
Chrysler	27,700	26,950
Ford	21,450	21,125
All others	9,630	10,790

■ STEEL buying during December is being confined to fill-in and supplementary tonnages, but mills are busy rolling the heavy tonnages placed in November, at prices prevailing then, and there has been no major test of the recent upward revision of flat-rolled steel prices. On what business has been placed, it is understood the new prices have been firm, and it is expected that when the net large buys are made around Jan. 15 there will be little deviation from the advanced level of quotations.

Locally, steel production has climbed to the highest point in over a year, last week figuring at 89 per cent. Increases at Ford have pushed the rate up steadily for the last three weeks, and the Rouge steel plant now has all but two furnaces making steel, seven of the regular battery being on, as well as the large mixing furnace in which two 175-ton heats are being produced daily.

■ CLERICAL workers at the Willys plant in Toledo, O., recently voted 96 to 3 against the UAW as bargaining representative. The UAW was claiming plant-wide jurisdiction in addition to its representation of 3000 production workmen, so elections were held by the NLRB to determine preferences. Maintenance mechanics and machinists voted 96 to 4 in favor of the MESA union as their representative. Die sinkers previously had been conceded to the Die Sinkers' Union, division of the International Association of Machinists, AFL affiliate.

Acquire Foundry Facilities

Modern foundry facilities are now available to the Toledo Scale Co. and its allied interests through recent purchase of the Defiance Machine Works, Defiance, O., by Toledo Precision Devices Inc., Toledo Scale subsidiary. The acquisition will permit the company to make a bid for a greater share of the market for heavy weighing machines and precision equipment. Don W. Champlin, New York industrial engineer, will be general manager at Defiance.

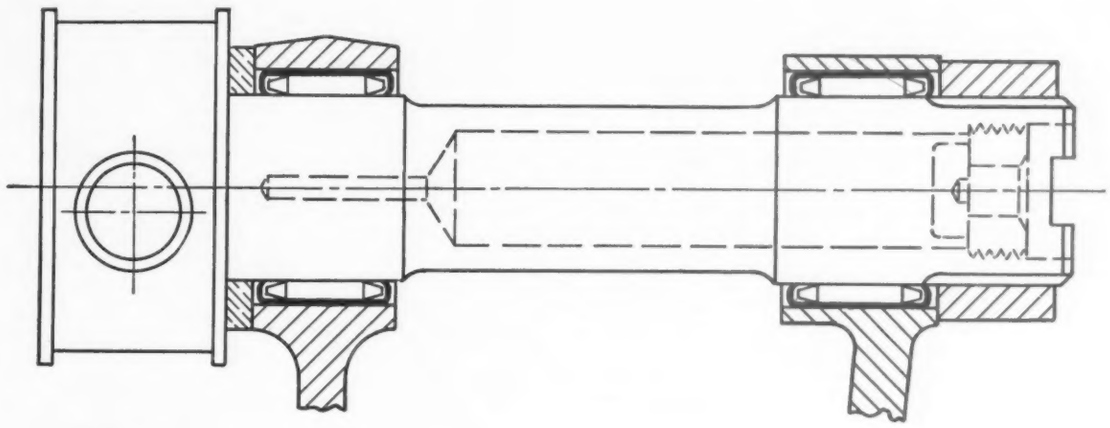
November sales figures from a few manufacturers uniformly show the improvement which is being registered this year over last. They are:

	Nov., 1938	Increase over Nov., 1937
Cadillac-LaSalle	4,285	1225
Pontiac	14,761	1931
Buick	21,576	2232
Chevrolet	76,938	4455

Year-end financial reports are reflecting the toll which depressed business conditions have exacted from the automotive and allied industries. Bordering on the stupendous was the net loss of $7,655,138 reported by Nash-Kelvinator for the year ended Sept. 30. Financial position of the corporation remains strong, despite the loss, with total current assets of $25,032,897, of which cash and government securities amounted to $12,687,875 and inventories $10,403,134.

TORRINGTON NEEDLE BEARING

DESIGN AND SERVICE FEATURES



THE TORRINGTON NEEDLE BEARING IN A REAR AXLE BRAKE CAM SHAFT—
A TYPICAL APPLICATION IN WHICH ITS COMPACTNESS SIMPLIFIES ASSEMBLY

BEARING CONSTRUCTION SIMPLIFIES ASSEMBLY

Ideal for Production Line Methods

THE compact construction of the Torrington Needle Bearing materially reduces assembly time and cost in such applications as the truck rear axle brake cam shaft illustrated. The needles are held in place by a hardened retaining shell, *forming a single unit which is easily pressed into place in the housing*—a particular advantage where the use of production-line methods requires the greatest possible ease and speed in assembly.

Further cost economies are effected by the bearing's low unit cost and by the simplification of the housing design. Long axially and small radially, the bearing occupies but little space, and can be mounted in the simplest type of housing.

High Unit Capacity

Even in small sizes, the Needle Bearing has unusually high radial capacity for either rotating or oscillating applications. Its full complement of needles provides many linear inches of contact, and permits heavy loading without overheating or undue wear.

The turned-in lips of the hardened retaining shell exclude dirt and form a reservoir for lubricant, holding ample quantities for long periods of operation without service attention. The needles actually rotate in a bath of the lubricant at all times.

The Torrington Engineering Department will cooperate in laying out bearing applications. Their long experience is at the service of manufacturers wishing to utilize the advantages of this bearing in their products. Further information is given in the Torrington Needle Bearing Catalog, available on request. Write for Catalog No. 10.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.

Makers of Ball and Needle Bearings

Branch Offices in all Principal Cities

TORRINGTON
NEEDLE BEARING

Re-employment, Employe Relations Studied at Congress of Industry

■ EMPLOYMENT relations received much attention at the Congress of American Industry, held at New York, Dec. 7-9, under the auspices of the National Association of Manufacturers.

Interpreting the wage-hour act, Administrator Elmer F. Andrews assured manufacturers violators will receive no mercy; on the other hand, there will be tolerance and sympathy for those who have difficulties but who desire to meet the administrator half-way.

Steady work makes for satisfied workers, said R. R. Deupree, president, The Procter & Gamble Co., Cincinnati. They do not fight improvements if their jobs are not at stake. Mr. Deupree mentioned one company which as a result of keying its distribution system to actual rate of consumption, has been able to guarantee 48 weeks' pay a year.

Any company which can forecast consumption of its product within 10 per cent, he said, can assure steady work.

The wage-hour law, he admitted, makes it difficult for companies to operate such plans, entailing as they do, operations at varying rates of capacity from week to week. Some concessions will be needed on the matter of flexible schedules.

Employment stabilizing plans, he thought, must be restricted mainly to the consumer goods industries. It would be practically impossible for manufacturers of industrial materials, such as steel, to guarantee steady work.

R. W. Moore, president, Canada Dry Ginger Ale Inc., New York, and chairman of the association's employment relations committee suggested application of these fundamental principles by management and employes, for better relations:

Mutual respect and consideration for problems and viewpoints; promotion of the widest understanding that the greatest measure of well-being for both, and maximum possibility of obtaining full economic value of their services lie in the development of the common enterprise; free interchange of ideas between management and employes on wages, hours and conditions of employment; development by each company of a sound and well-defined employment policy.

Confidence Never Legislated

Co-operation, he said, can only come about as a result of mutual confidence and mutual confidence can never be legislated.

Mr. Moore presented principles which, he recommended, should be observed by legislators as fundamental:

1—The proper function of government in labor relations is to insure equal rights for employer and employe, with due regard for public interest; 2—the right of workers to self-organization and to bargain collectively through representatives of their own choosing should include the full and free voluntary exercise of such right without interference, restraint or intimidation from any source; 3—when a controversy has reached a stage where legal or judicial action becomes necessary, such action should be in accordance with long-established rules of judicial procedure; 4—any legislation affecting relations of employer and employe should in its provisions and administration observe the constitutional rights of free speech, right of property and the right to work or not to work.

The committee believed annual wage plans guaranteeing industrial employes certain compensations might lessen the incentive to produce. A better plan is to guarantee a certain amount of employment, or the use of a wage incentive basis which stimulates production. The committee warned that a study of profit sharing indicated that there are no broad rules but that the possibilities differ in different plants and different industries.

No substantial progress has been made in reducing unemployment, said George H. Houston, chairman of the association's industrial finance committee. The answer is to create re-employment where the unemployment exists; there isn't time to wait for new products and new goods to absorb idle workers.

Huge Shortage of Capital

Shortage of capital in industry today, he estimated, is from fifty to seventy billions of dollars.

Chiding manufacturers for the moderation which had characterized their remarks about the national labor relations act, Senator Edward R. Burke, of Nebraska, severely castigated the act and its administration by the national labor relations board. Every indication is that the act will be revised materially by the next congress and that the labor board will be stripped of much of its present vast power, he said.

Gerard Swope, president, General Electric Co., Schenectady, N. Y., discussed labor relations in Sweden and Great Britain. While these systems could not be transplanted here in their entirety, much could be adopted.

High-lighting the annual banquet, Anthony Eden, Great Britain's former under-secretary for foreign affairs, warned democracy of the perils that beset it when there is a strong trend toward the loss of individual liberties and the setting up of state idolatries.

The dinner also was featured by a masterly summary by H. W. Prentis Jr., president, Armstrong Cork

◆

Steel Sieve To Clear Water

■ This trashrack is to remove silt and debris from Colorado river water at Imperial dam, California. Water diverted by headgates will flow through the steel sieve, then begin its passage over desert to irrigation canals in California valleys

Co., Lancaster, Pa., of industry's platform for 1939. This detailed the approach industry would make to the problem of providing jobs for all who are able and willing to work.

Next year industry will be tempted to raise prices, said Dr. O. M. W. Sprague, Harvard university, Cambridge, Mass. It should resist such temptation. What is needed now is more employment, more production. Industry should strive to reduce prices rather than advance them, and thus increase the real purchasing power of the low-income group, bring greater governmental friendliness to industry.

Besides, said Dr. Sprague, if prices are increased, labor will want higher wages, and industry will not gain.

Senator Joseph C. O'Mahoney, Wyoming, emphasized danger of continued expansion of discretionary government control over business. The senator, who is chairman of the temporary national economic committee, declared extension of bureaucracy does not offer a cure for the nation's economic troubles.

Economy Must Be Free

"The economic life of a people," said the senator, "thrives best in a free atmosphere. Once it is brought within the power of any man, board, group or faction to control, it ceases to be natural and inevitably becomes restricted by the ideas, the comprehension and the predilection of the men exercising the power. It is not a democratic system."

Administrative law must be surrounded with effective safeguards for private rights or America will develop a bureaucracy as extensive and dangerous to popular government as any which threatens the people of Europe, warned James A. Emery, the association's general counsel.

Industry is fairly sharing the burden of training research workers, charged Dr. Isaiah Bowman, president, Johns Hopkins university, Baltimore. Since 1920 more than one thousand research laboratories have been established in the United States; in that year we had 575 while today we have 1760. Industry should assist the universities to train an adequate supply of such men.

Value of research work to industrial organizations also was stressed by Dr. Carl Breer, director of research, Chrysler Corp., and by Dr. Willard H. Dow, president, Dow Chemical Co., Midland, Mich.

The manufacturers adopted a resolution calling on congress, transportation agencies and industrialists to give their best thoughts and efforts to obtaining a satisfactory solution of the transportation problem.

Steel Expansion 1030% Since '89

■ TOTAL manufacturing capacity of furnaces producing steel in the United States has expanded approximately 1030 per cent since 1889, although the number of such furnaces has increased only 350 per cent, according to the American Iron and Steel institute.

Technical progress in furnace construction, principally in the open-hearth type, has resulted in a larger increase in total capacity than in the number of furnaces. The average annual capacity of each steel producing unit today is approximately 62,000 tons, as compared with 25,000 tons in 1889, an increase of approximately 150 per cent.

Steel plants are now of four different types. The total number of such units, operated by 74 different companies, is 1186, and their total annual capacity on July 1, 1938 was 73,047,892 tons of steel ingots and steel for castings. In 1889, there were only 259 units of three different types, with a total capacity of 6,461,161 tons.

Open-hearth furnaces number 995, with an annual capacity of 65,151,152 tons. This is 84 per cent of the total number of steel producing units, and 89 per cent of annual steel producing capacity. A half-century ago, there were only 103 open-hearth furnaces, which represented but 40 per cent of all steel producing units.

Bessemer converters, electric furnaces and crucibles together account for only 16 per cent of the total number of units, and for only 11 per cent of the nation's annual capacity. In 1889, when electric furnaces were not yet in use, bessemer converters and crucibles accounted for 60 per cent.

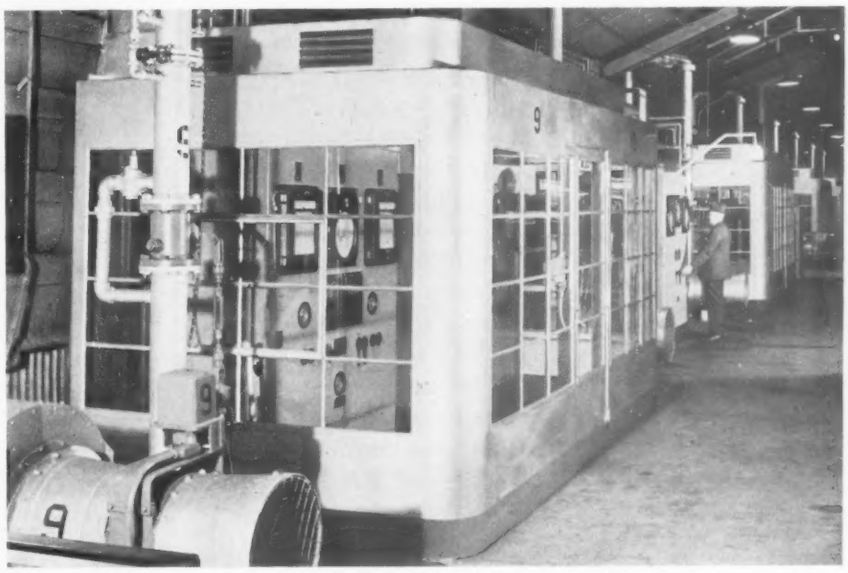
Air Conditioning Orders Increase in October

■ Orders for air conditioning equipment booked during October by 125 manufacturers amounted to $3,436,197, gaining 12.6 per cent over September, according to the department of commerce. However, this was a decline from the $3,891,050 total of October, 1937.

For the first ten months orders decreased sharply to $35,044,076 from $56,150,918 for the same period last year.

One manufacturer, Riggs Distler & Co. Inc., Baltimore, recently received awards for large ventilating, heating and air conditioning installations and will soon place orders for materials and parts costing more than $4,000,000.

Soaking Pit Control Panels Enclosed



■ **Control panels for 16 soaking pits at Edgar Thomson works, Carnegie-Illinois Steel Corp., Braddock, Pa., are housed two each in glass and steel enclosures. Panels and combustion controls were engineered by Hagan Corp., Pittsburgh, are enclosed to minimize dust and dirt and make them inaccessible to unauthorized persons. Complete instruments are installed with the controls on each panel to indicate and record the factors being controlled. Pits were installed by Amsler-Morton Co., Pittsburgh, in the newly enlarged mill, formally opened Dec. 13**

EDITORIAL

Industry's Program for America's Progress

■ A STATESMANLIKE document is the Platform for Industry for 1939, drafted by a committee comprising sixty-four of the country's leading industrialists and unanimously approved by the congress of American industry, held Dec. 7-9 under the auspices of the National Association of Manufacturers.

Today there are far too many employable men and women who want work and cannot find it—The first concern of business continues to be recovery and jobs—There is an enormous pent-up demand which, if met, would provide jobs, raise living standards and increase security—America's progress depends on a united effort of industry, commerce, agriculture and labor in co-operation with government. Such were the principal statements in the preamble.

Trust Placed in American Ideals; Would Remove Cause of Idleness

The platform re-affirmed faith in time-honored American principles: Religious and other individual liberties; representative political democracy; private enterprise. America's main problem today, said the document, is the application of these time-tested principles and institutions to the conditions and requirements of present-day society. The document recognized the necessity for unemployment relief, but cited as the primary obligation the creation of healthy business by eliminating the causes of unemployment.

For better understanding, industrial management should:

1—Interest itself actively in the economic and social needs of the times; present suggestions to meet the problems involved; tell the story of industry's views and accomplishments to the public.

2—Publish frequently simple and informative statements concerning financial and other operations, in order to interest both employes and stockholders more directly as to company problems and operations.

3—Consistently maintain quality standards; develop and improve products offered, by means of market research, technical research and experimentation; make price adjustments as rapidly as improved manufacturing processes and other economies will permit without injustice or injury to employes, creditors and owners, including stockholders.

4—So manage its financial, inventory and customer credit policies as to effect the maximum volume of production, distribution and employment that can be maintained continuously.

5—Maintain sound relations with its employes as set forth elsewhere in the platform.

6—Conduct its business so that it is at all times a desirable citizen of the local community in which it operates.

7—Encourage effective functioning and co-operation of associations to consider community, state and national problems.

Good Treatment of Labor Held Cardinal Point in Progress

The platform recognized the right of labor to bargain in whatever form it desires and pledged full co-operation of industry toward a cessation of disturbed labor relations which of late have been a major obstacle to recovery. It urged employers to maintain well-defined labor policies; to provide opportunity for free interchange of ideas between management and employes; opportunity for "prompt consideration and adjustment of complaints and fair wages for work performed, with incentives where they can be fairly applied as a reward for individual or group accomplishment; to maintain good working conditions."

Industrial management, the platform held, should endeavor to cushion the effects on individual employes of the intro-

(*Please turn to Page* 64)

THE BUSINESS TREND

Activity Index Touches New 1938 High

■ ADDITIONAL gains were recorded in a number of industrial barometers during the week ended Dec. 10. Reflecting this condition STEEL'S index of activity in the iron, steel and metalworking industries registered a moderate gain of 0.6 points to 100.7 per cent. This represents a new high since Oct. 16, 1937. A year ago at this time the index stood at 80.5 per cent.

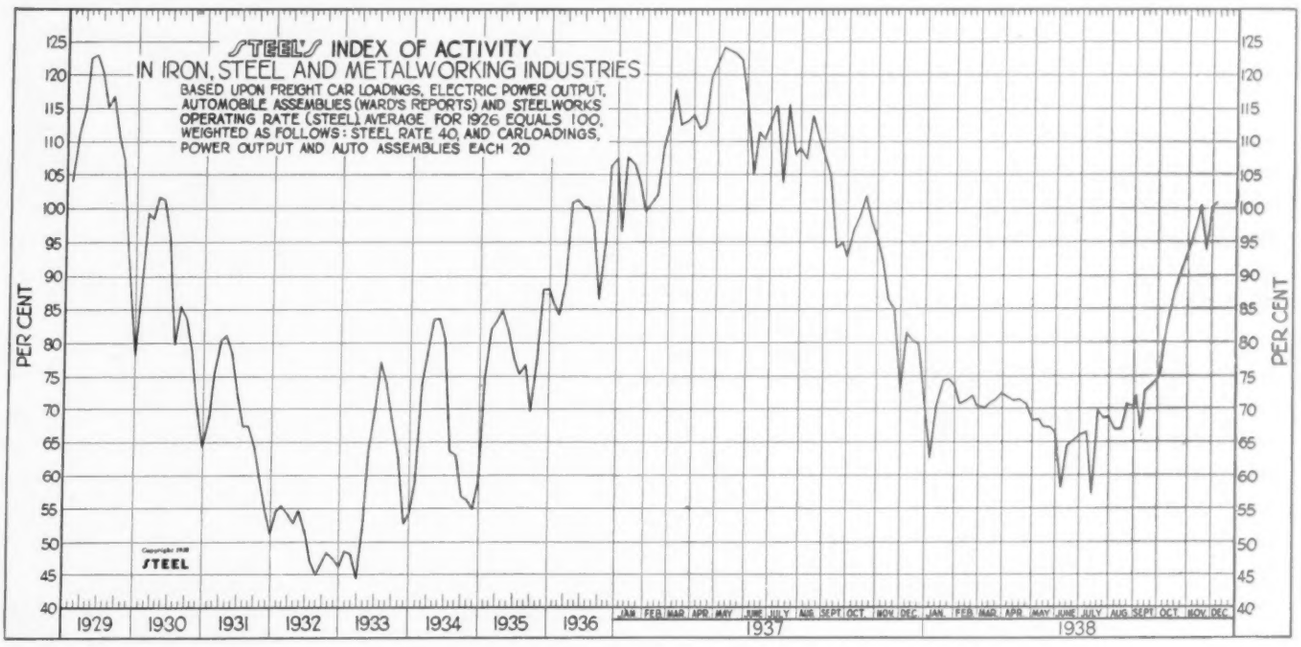
Electric power consumption recorded the sharpest advance of any the barometers composing STEEL'S index, during the week ended Dec. 10. After registering a less than seasonal advance in the preceding week, this indicator forged ahead to a new high for this year and just fell short of exceeding the all-time peak of 2,320,982,000 kilowatt-hours recorded in the week ended Sept. 4, 1937.

Among the manufacturing industries the expansion in the automotive industry has been outstanding the past two months. Exceeding the 100,000 mark for the first time in sixteen months, automobile assemblies advanced to 100,705 units in the week ended Dec. 10. This compares with 97,795 cars in the preceding week and remains substantially above the 85,765 units assembled in the identical week last year. A continuation of the upward pace which began in September is anticipated for the week ended Dec. 17.

Steelmaking operations remained unchanged at 61 per cent for the week ended Dec. 10, but was still more than double that of the corresponding week last year. A moderate downward movement in the national steel rate to slightly lower levels is anticipated through the remainder of this year.

The only one of the four barometers composing STEEL'S index to record a decrease in the week ended Dec. 10 was revenue freight carloadings. Official total in that week of 619,340 cars represents a more than seasonal decrease from the 649,086 loaded in the week ended Dec. 3. In the identical week last year freight carloadings were 622,131.

Business sentiment has improved somewhat on the basis of continued increase in automobile production and the resistance of the national steel rate to decline seasonally. Developments soon after the first of the year



STEEL'S index of activity gained 0.6 *points to* 100.7 *per cent in the week ended Dec.* 10:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Sept. 3	72.3	104.8	87.5	70.9	55.1	70.3	45.4	65.3	79.0	106.3
Sept. 10	66.8	94.3	83.1	70.1	53.5	65.5	44.9	60.9	85.9	114.0
Sept. 17	72.9	95.0	90.1	69.4	58.7	69.1	47.8	65.6	86.2	112.2
Sept. 24	74.0	93.0	86.2	68.5	58.1	68.2	48.0	65,2	83.8	110.7
Oct. 1	74.9	96.6	89.0	73.3	59.3	66.9	47.7	62.4	81.0	109.1
Oct. 8	78.9	99.0	93.4	74.9	54.7	67.4	48.4	61.5	79.4	108.2
Oct. 15	84.3	101.8	95.5	77.4	56.4	66.0	48.7	57.9	77.5	106.1
Oct. 22	88.7	97.5	97.1	82.4	58.2	60.9	48.7	58.2	77.4	104.8
Oct. 29	91.4	95.7	99.1	86.4	56.3	58.0	48.3	55.9	72.5	102.5
Nov. 5	93.4	92.3	102.1	88.4	55.0	52.3	48.5	56.0	71.5	98.1
Nov. 12	95.9	86.5	107.9	88.8	54.9	50.7	47.7	55.5	73.0	91.6
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49.7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4

will definitely demonstrate whether or not business is prepared to extend the substantial gains witnessed during the past few months.

NOVEMBER FREIGHT CAR AWARDS DECREASE

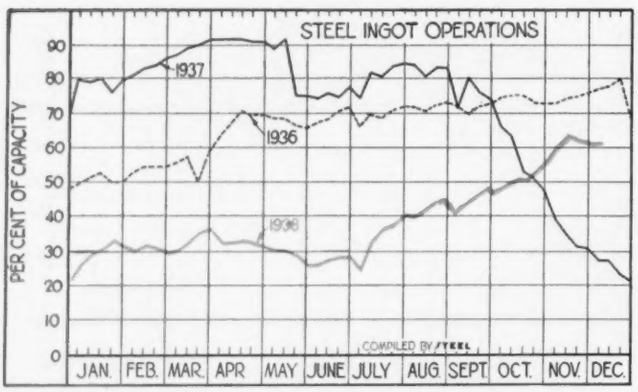
Dominated by the award for 1000 box cars by the Illinois Central railroad, domestic freight car awards in November totaled 1232 cars, compared with 2537 in October and 1750 in September. In November last year car awards totaled 275. The highest monthly total so far this year was 6014, in May. During the first eleven months awards aggregated 13,792, compared with 51,336 in the corresponding period last year; 41,073 in the same period during 1936 and 19,308 in the first eleven months of 1935. November bookings represent the fourth highest monthly total to-date this year.

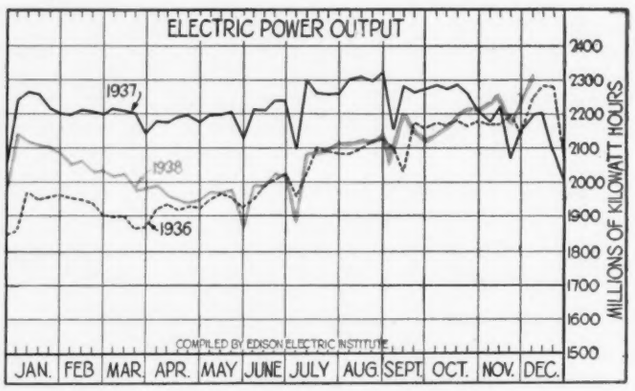
FINISHED STEEL SHIPMENTS LARGEST THIS YEAR

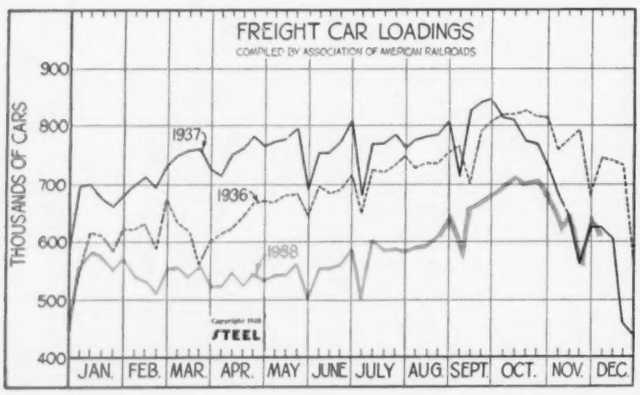
Shipments of finished steel products during November by the United States Steel Corp. showed an increase of 16,366 tons to 679,653. This compares with 663,287 tons in October and represents an increase of 92,412 over the 587,241 tons shipped in November last year. November shipments were not only the largest this year but also exceeded for the first time the comparable period last year. For the eleven months ended Nov. 30 shipments totaled 5,931,164 tons, against 12,336,397 tons in the same 1937 period, and 9,716,908 tons in the first eleven months of 1936.

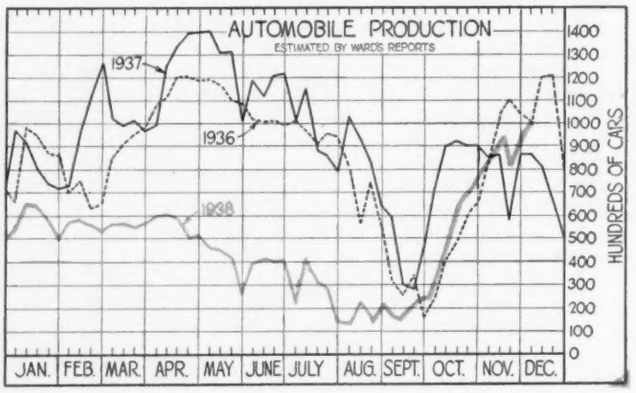
NET RAILWAY OPERATING INCOME IMPROVES

Net operating income for class I railroads during October amounted to $68,565,755, against $60,860,439 in the same month last year and $50,361,753 during September. Rate of return on property investment in October was 1.99 per cent, compared with 1.70 per cent in September. For the first ten months the net operating income totaled $273,709,020 or a return on investment of 1.24 per cent, compared with $531,689,942 equal to an investment return of 2.42 per cent during the same period last year.



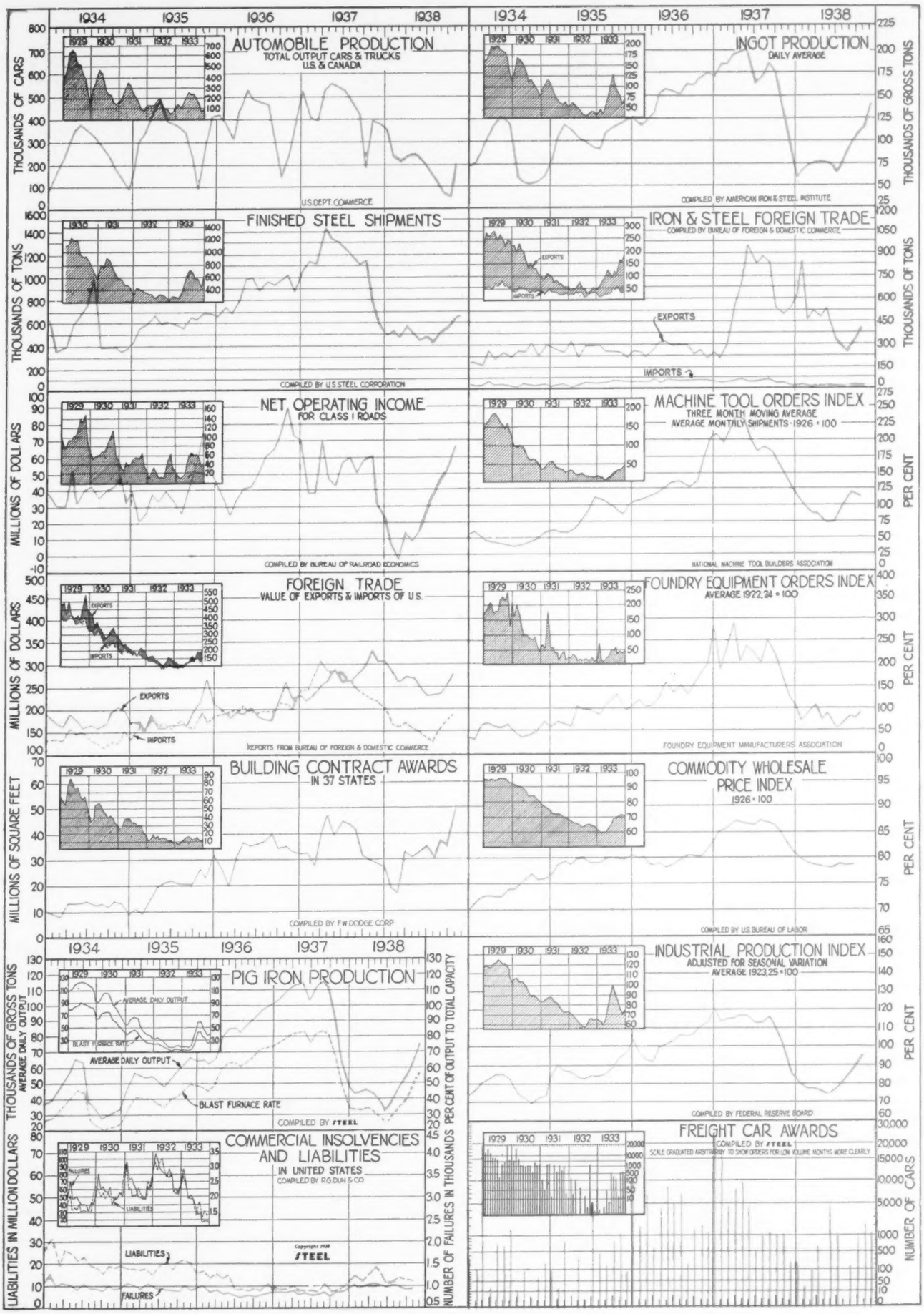




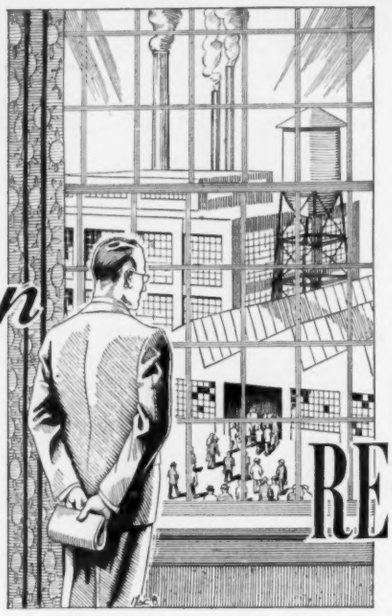


Week ending	Steelworks Operating Rate Per Cent 1938	1937	1936	Electric Power Output Million KWH 1938	1937	1936	Freight Car Loadings 1938	1937	1936	Weekly Auto Output 1938	1937	1936
Sept. 3	44.5	83.0	71.5	2,148	2,320	2,098	648,039	804,633	764,680	22,165	64,200	31,628
Sept. 10	41.5	72.0	69.5	2,048	2,154	2,028	568,887	711,299	699,859	17,485	59,017	26,750
Sept. 17	46.0	80.0	72.5	2,214	2,280	2,170	660,142	826,565	789,510	16,100	30,150	33,165
Sept. 24	48.0	76.0	73.0	2,154	2,265	2,157	675,553	840,446	807,070	20,390	28,030	15,680
Oct. 1	47.0	74.0	74.5	2,139	2,275	2,169	697,938	847,245	819,126	25,405	45,830	22,800
Oct. 8	48.5	66.0	75.0	2,154	2,280	2,168	702,964	815,122	820,195	37,665	71,958	39,945
Oct. 15	51.5	63.0	75.0	2,182	2,276	2,170	726,612	809,944	826,155	50,540	89,680	48,195
Oct. 22	51.5	53.0	73.0	2,214	2,281	2,166	705,628	773,353	815,972	68,360	91,905	59,740
Oct. 29	54.5	51.0	73.0	2,226	2,254	2,175	708,840	771,655	814,175	73,335	90,155	66,985
Nov. 5	57.5	47.0	73.0	2,207	2,202	2,169	673,333	732,145	759,318	80,030	89,770	84,305
Nov. 12	61.5	39.0	74.0	2,209	2,176	2,169	636,710	689,614	784,672	86,300	85,325	104,248
Nov. 19	63.0	35.0	74.5	2,270	2,224	2,196	657,477	647,251	790,500	96,735	85,757	110,160
Nov. 26	62.0	31.5	75.5	2,183	2,065	2,133	562,084	558,627	679,984	84,930	58,955	104,283
Dec. 3	61.0	30.5	76.5	2,285	2,152	2,243	649,086†	623,337	744,957	97,795	86,173	100,395
Dec. 10	61.0	27.0	77.5	2,318	2,196	2,278	619,340	622,131	738,747	100,705	85,765	119,455

†Revised.


AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
U.S. DEPT. COMMERCE
THOUSANDS OF CARS
INGOT PRODUCTION
DAILY AVERAGE
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
THOUSANDS OF GROSS TONS
FINISHED STEEL SHIPMENTS
COMPILED BY U.S. STEEL CORPORATION
THOUSANDS OF TONS
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
THOUSANDS OF TONS
NET OPERATING INCOME
FOR CLASS I ROADS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MILLIONS OF DOLLARS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
PER CENT
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
EXPORTS
IMPORTS
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
MILLIONS OF DOLLARS
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
PER CENT
BUILDING CONTRACT AWARDS
IN 37 STATES
COMPILED BY F.W. DODGE CORP.
MILLIONS OF SQUARE FEET
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PER CENT
PIG IRON PRODUCTION
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
COMPILED BY STEEL
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
PER CENT OF OUTPUT TO TOTAL CAPACITY
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
PER CENT
COMMERCIAL INSOLVENCIES AND LIABILITIES
IN UNITED STATES
COMPILED BY R.G. DUN & CO.
FAILURES
LIABILITIES
Copyright 1938 STEEL
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Forum on RE-EMPLOYMENT



■ WHILE millions of idle men and women are unable to find employment at fair wages there can be no real prosperity in this country. How can this basic problem be solved, to the end that there will be a job eventually for everyone able and willing to work?

Virtual sterilization of the ample funds now in our banks prevents expansion of existing industry and organization of new industries, holds Fred H. Chapin, president, The National Acme Co., Cleveland. Mr. Chapin is convinced that as long as this condition obtains, no notable progress can be made toward solving the unemployment problem.

Inventors and designers today have more exact scientific and engineering knowledge and in this respect are in a position to organize new enterprises on a sounder basis than was possible under the rule-of-thumb engineering methods employed by a past generation. Removal of the existing restrictions which force capital into hiding will bring industrial expansion and thus provide more jobs.

Mr. Chapin believes the answer to the problem of directing more capital into job-producing investments must be solved at Washington. Recent expressions of public opinion, he believes, foreshadow a national policy more favorable to such creation of new jobs.

Because of his many years of experience—not only in the upbuilding and management of companies well known in the field of metalworking but also as an official of one of our largest banking institutions—Mr. Chapin's convictions rest upon an unusually solid foundation.

—The Editors

■ MY CONVICTION is that a large measure of responsibility for continued and widespread unemployment rests with Washington. However, since the recent elections I feel that an awakening to realities has begun to take place among thousands of working people, which is due to be echoed in the halls of Congress in no uncertain manner. Therefore there now is at least some basis to hope for an end to further restrictive legislation. There also is possibility of an easing of some of the many restrictive laws enacted under the pressure of the "emergencies" during recent years.

I am most gravely concerned over virtual "sterilization" of the ample funds now in our banks—insofar as their use in re-equipping and thereby reviving older industries, and in developing and properly equipping new industries is concerned. America has in the past been a land of opportunity for the working man, not merely because it was a country which had not outgrown its territorial limits. A much more important reason was that it has been a country blessed with extraordinarily active industrial imagination and one in which investors both large and small were always ready and eager to finance new inventions and new industrial enterprises, regardless of element of chance which unavoidably enters into such investments.

Risk Less Today

As a matter of fact the old-time investor in a new industrial enterprise risked much more than would the investor in a similar enterprise today, by reason of the fact that old-time individualistic inventors and designers did not have the benefit of scientific discoveries and exact engineering knowledge available to the much better organized staffs of inventors and designers today.

For instance, when my own company was founded, its success all hinged on the performance and possibilities of a new machine designed largely by rule-of-thumb methods by a group of practical mechanics without formal engineering training, and built by them from odds and ends and from parts of very uncertain characteristics in a small shop with wholly inadequate equip-

ment. The ingenious workmen who developed this original machine were, however, men of persistence and of strong character who were willing, under the circumstances, to work long hours for relatively small pay. They had faith in themselves as well as in their machine. On the strength of this they were able to go out and get—in Cleveland, from conservative Cleveland bankers and other business men—the necessary financial backing. This brought to Cleveland an enterprise which over a period of more than 40 years has given employment to thousands of people and which has brought into Cleveland from all over the world many millions of dollars.

New Enterprise Difficult

It is no reflection upon contemporary inventors and designers when I say that such a thing could hardly be done today. Americans are just as ingenious as they ever were, they are much better trained technically, and the potential market for mechanical products is bigger than ever before. However, it is very difficult now—on account of restrictive legislation—to launch a new industrial enterprise — primarily because it is so difficult to finance it. The banks would like to be able to participate, as they used to, in the financing of sound projects of this kind but their restrictions are so severe that it cannot be done. Large individual investors hesitate to do it, because new labor problems also created by recent legislation loom behind every growing company and threaten to smother it before it can get a firm hold on life. Inventors and engineers who otherwise would be inclined to break old industrial ties and launch new undertakings also are discouraged from doing so because the foregoing and other artificial restrictions tend to smother individual ambition and initiative.

The net result has been that for the past several years the growth of America as far as new manufacturing plants is concerned has not been at all satisfactory, nor have the older companies grown and renewed their equipment to any hopeful extent. This state of affairs has choked off the normal increase in employment and at the same time it has kept the capital goods industries—my own included —from maintaining anything like a satisfactory level of employment.

To my way of thinking, the wholesale purchase by banking institutions of government securities is literally making the banks finance unemployment—instead of financing employment as used to be the case. By that I mean that this money now seems eventually destined to be dribbled away in the form of relief of one kind or another, when it otherwise would have been invested in worthy industrial projects.

These industrial projects in themselves would quickly take a lot of people off the relief rolls and at the same time would really be "self-liquidating." Furthermore they would indirectly generate productive employment for many more people in the capital goods industries, in the raw material field and elsewhere. I can see definite possibilities that millions of dollars invested in this latter manner will pay real dividends in cash and in the well-being of the people—especially the working people of America. I am also convinced that the principal itself will be repaid within a reasonable length of time out of wealth created through properly financed American industrial brains.

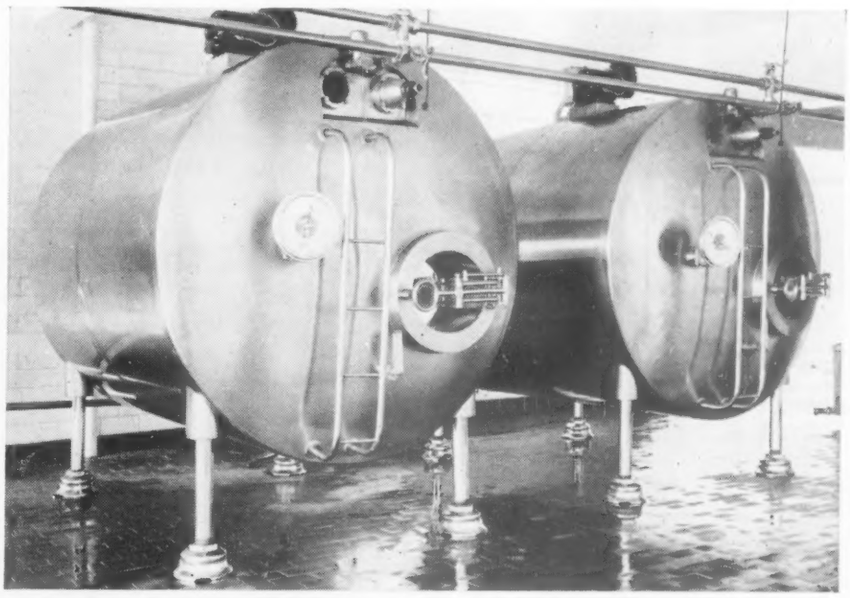
Fred H. Chapin

President, National Acme Co., Cleveland

On the other hand, when I read of billions being borrowed by our government for direct relief or for "made work" in the form of huge projects of doubtful economic value, I see possibilities of present unemployment and relief becoming chronic; of declining values in government securities; of inflation with its printing press money; and even the possibility of repudiation and eventual breakdown of our American form of government.

However, with recent signs of active stirring "down among the grass roots," my faith in the future of America has been tremendously strengthened. I hope and believe that there soon will be found ways and means of releasing into industry a lot of what at present is sterilized money. I look to continued awakening on the part of working people to the necessity for more friendly co-operation toward the resulting development of new industries and the revival of established ones. This will put an end to abnormal unemployment. The sooner certain powers in Washington realize it, the better.

Stainless Storage



■ **Built to hold over 2000 gallons each, these stainless steel milk storage tanks were installed recently at the plant of Sanitary Farms Dairies Inc., St. Paul. Inner shells are 14-gage stainless and outer shells are 16-gage, with a 2-inch corkboard insulation between. Tanks are 7 feet in diameter and 9 feet long. Heil Co., Milwaukee, is the fabricator**

Huge Plant Goes Into Full Production

Officially opened December 15, new plant has 80-inch hot mill with yearly output of some 600,000 tons, 5-stand tandem cold mill for 14 to 30-gage stock, temper mills, complete pickling and annealing facilities

■ WITH THREE major divisions—an 80-inch continuous hot strip mill, a complete cold reduced tin plate mill, and a cold reduced sheet and strip mill with all necessary pickling, annealing and finishing facilities—the new Irvin works near Pittsburgh enables Carnegie-Illinois Steel Corp. to supply practically all types of sheets and strip from 18 to 77 inches in width.

Plant site covers a total of 653 acres and includes a river pumping station, reservoir, water treatment and sewage disposal plants where wastes are treated before discharge to the river. Over 13 miles of standard gage railroad track within the plant is directly connected to the Union railroad. The group of buildings forming the mill itself has an overall length of 4275 feet and an overall width of 1229 feet. Two largest individual structures are the hot strip mill, 95 x 2424 feet, and the annealing building, 125 x 2544 feet, both with no intervening cross partitions. The 17 buildings comprising the plant cover 51½ acres. Fifty overhead traveling cranes are installed, ranging in capacity from 5 to 60 tons with auxiliaries up to 15 tons.

Approximately 4,300,000 cubic yards of earth and rock were moved in creating a man-made plateau for this plant, 227 feet above water level on the west bank of the Monongahela river, approximately 13 miles above Pittsburgh. The new mill will be operated on a smokeless basis, gas being used throughout with the exception of two boilers in the powerhouse. These burn either coke breeze or coke oven gas or a combination of both as desired, all on a smokeless basis.

Electric power supply comes to this mill from 66,000 volt, 60 cycle transmission lines. Substation includes three, 3 phase, 69,000 to 6900 volt transformer units, each having a self-cooled capacity of 25,000 kilovolt amperes and a forced air capacity of 33,333 kilovolt amperes. Large alternating current motors for the mill and the Monongahela river pumping station as well as drives for auxiliary 250-volt, direct current, motor generator sets are supplied directly from the 6600-volt distribution system. Medium and small size alternating current motors, lighting transformers and miscellaneous loads are served from 6900 to 460-volt auxiliary transformers.

Tin Plate Produced First

The cold reduced tin plate division of the new plant was the first to be completed. Strip pickling, cold reduction equipment and all facilities for the production of tin plate were ready for operation in March, 1938. Therefore, pending completion of the plant, coiled strip was shipped in from the McDonald 43-inch hot strip mill in the Youngstown area.

Slabs for the Irvin hot strip mill are shipped in over the Union railroad from Edgar Thomson works, approximately 6 miles away. To

General view of 80-inch continuous hot strip mill at Irvin works

assure a steady supply of slabs to the Irvin mill, the Edgar Thomson plant has been expanded by the installation of a modern 45 x 80 inch, reversing, universal slab mill capable of handling ingots up to 45,000 pounds and rolling slabs up to 8 x 60 inches x 30 feet long. Because of furnace limitations, maximum length of slabs furnished to the Irvin plant is 18 feet.

Slab Storage Ample

These slabs are stored in a 64,000-ton slab yard at north end of the Irvin works near the 80-inch continuous hot strip mill. Slab conditioning beds with special facilities for removing surface imperfections by oxyacetylene scarfing are provided at each end of the slab yard. Three, continuous, zone controlled, triple fired, slab heating furnaces utilizing coke oven gas are installed to assure an ample supply of hot slabs for rolling. Both ends of the furnace approach table are equipped with magazine feeders. Each furnace has two motor-operated slab pushers. A slab-return conveyor is installed at the end of the mill approach table.

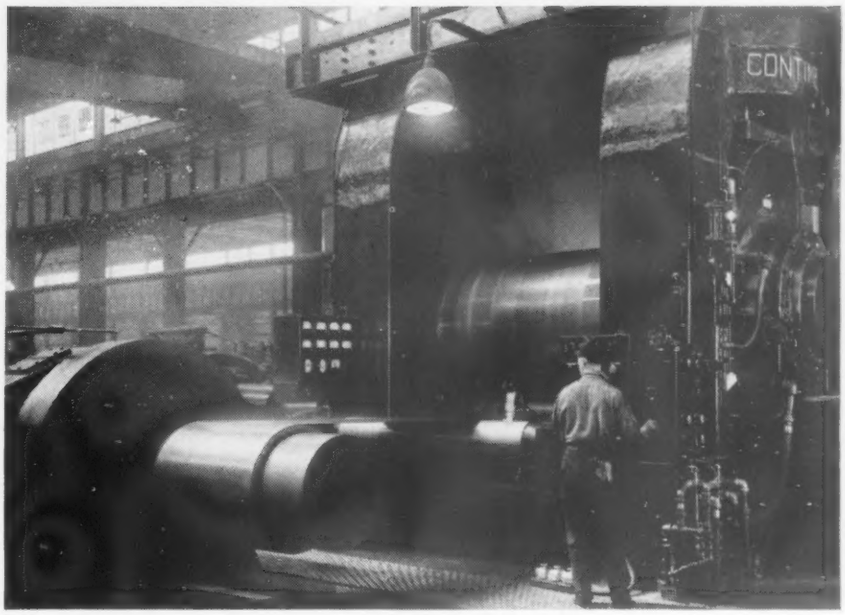
On leaving furnaces the hot slabs advance through a 2 high, 36 x 66 inch, scale breaker, driven by a 1250 horsepower, alternating current motor. Scale is removed by water sprays at 1350 pounds pressure. Next comes a 4-high spreading mill, equipped with turntables for rotating the slabs before and after rolling. This mill has 38 x 130-inch work rolls and 51 x 124-inch backup rolls. It is driven by a 3500 horsepower, alternating current motor. After leaving the spreading mill, slabs advance to the hydraulically operated squeezer where they are squared up before further rolling.

No. 2 universal roughing stand has 38 x 81-inch work rolls and 51 x 76-inch back up rolls and is driven by a 3500 horsepower, alternating current motor. No. 3 and 4 universal roughing stands each have 34 x 81-inch work rolls and 53 x 76-inch backup rolls. These stands also use 3500 horsepower, alternating current motors. Two rotary crop shears are provided in the table between No. 4 roughing stand and the finishing scale breaker, where the front and tail crops may be sheared off as required. The piece is held on the approach table until its temperature is right for entering the finishing train. No. 2 scale breaker is a 2 high, 25½ x 80 inch mill, driven by a 500 horsepower, variable speed motor.

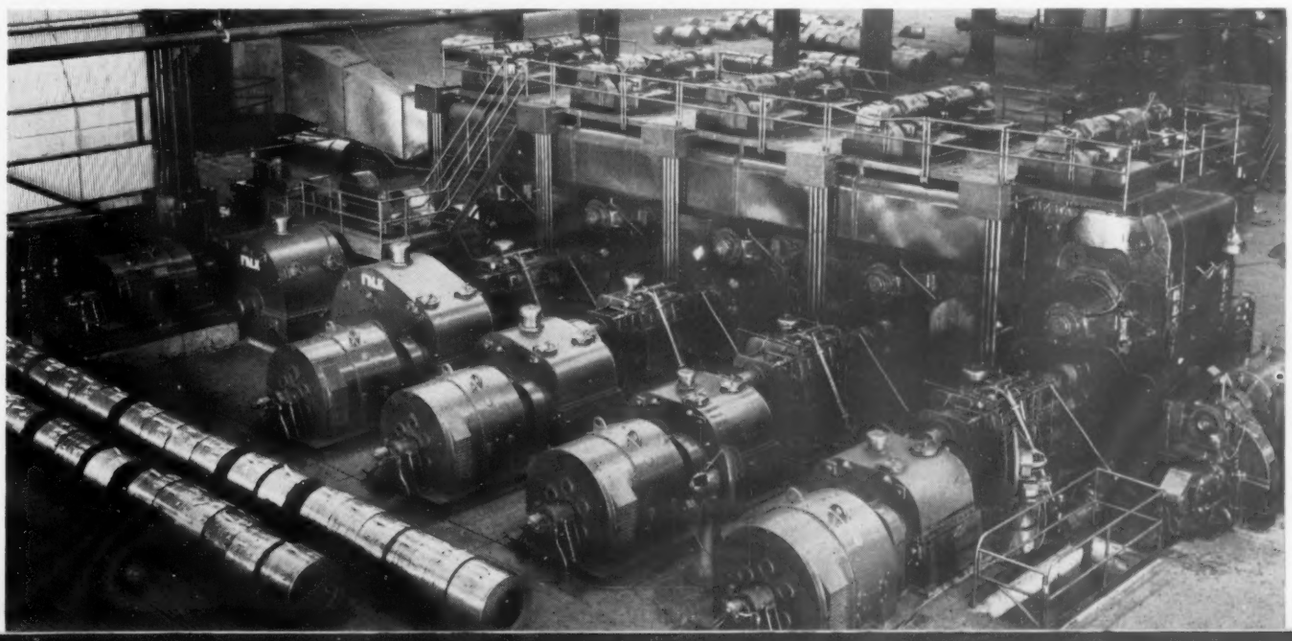
Finishing train consists of six 4-high stands equipped with 27 x 81-inch work rolls and 53 x 76-inch backup rolls. No. 5 and 6 stands are driven by 4500-horsepower motors, Nos. 7, 8 and 9 by 5000-horsepower motors and No. 10 by a 2500-horsepower motor, all being direct current units as are also motors on the hot runout table. A rotary flying shear follows the last finishing stand to square up the head end of the strip or to cut it into sheets as desired. Strip leaves the last finishing stand at 1000 to 2000 feet per minute. The hot runout table is approximately 700 feet long to the piler and scale, with two coilers located approximately 380 feet from the last finishing stand.

Nominal rating of the 80 inch, continuous, hot strip mill is 600,000 gross tons per year of hot rolled strip in sheet or coil form.

The two coilers on the hot mill line discharge to short conveyors which transfer hot coils to a 1270-foot cooling conveyor. Down tilters, discharging both right and left about midway down this conveyor line, deliver coils to the raw coil storage rooms. A third down tilter is provided at the end of the conveyor line. Two 20-ton cranes, 120-foot span, cover the main raw coil storage building, a third similar crane



Tension reel end of 84 inch, 3 stand, tandem, cold reduction mill



Drive side of 5 stand, tandem, cold reduction mill in new plant

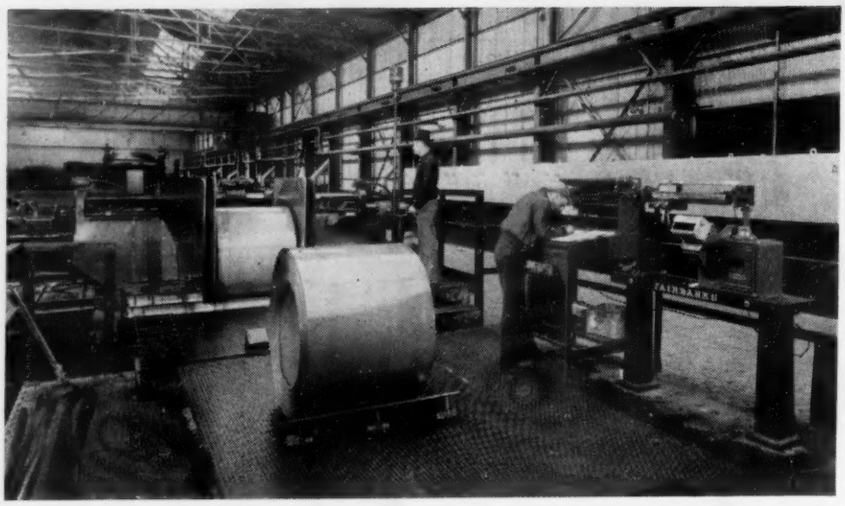
delivering raw coils from this storage building to the pickling lines.

Hot strip finishing department lies between the raw coil storage rooms at the end of the 80 inch, hot strip mill and the cold reduced finishing department. Provision is made for handling either strip or sheet as it comes from the 80-inch mill. Equipment in the hot strip finishing department consists of flying shears, resquaring shears, temper mills, recoiling and side trimming lines, with a sheet pickler and scrubbing lines. Conveyors and transferring equipment have been installed so products of this department can be diverted to processing units with a minimum of handling.

Pass Through Pickling Lines

Coils for cold reduction pass through either of two continuous pickling lines in the raw coil pickling department. This section of the plant connects to the south end of the raw coil storage building and extends east to the cold reduction department. One pickling line is designed to handle strip up to 38 inches in width and the other will take coils up to 77 inches in width. Gravity type conveyors receive pickled coils from recoilers and take them to a point from which tractors deliver them to the cold reduction department or storage as required.

Here the flow lines split, part of the material swinging to the tin mill and part to the cold reduced sheet division.



This is delivery end of 80 inch, continuous, raw coil pickler showing recoiler and scales

Pickled coils for either tin mill black plate or tin plate are cold reduced in either a 5 stand, tandem, 4 high, 20½ and 53 x 42 inch mill or a 4 high, 20½ and 53 x 54 inch, reversing mill. The 5-stand tandem mill with rated capacity of approximately 100,000 gross tons per year has a 600-horsepower motor on the first stand and 1500-horsepower motors on each of the remaining four stands. Strip speed ranges from 600 to 1565 feet per minute. This mill will handle stock from 16 to 38 inches wide in coils of 20-inch inside diameter, 54-inch outside diameter and in gages from 14 to 30. Reversing mill is powered by a 3500-horsepower motor and operates at strip speeds from 500 to 1100 feet per minute.

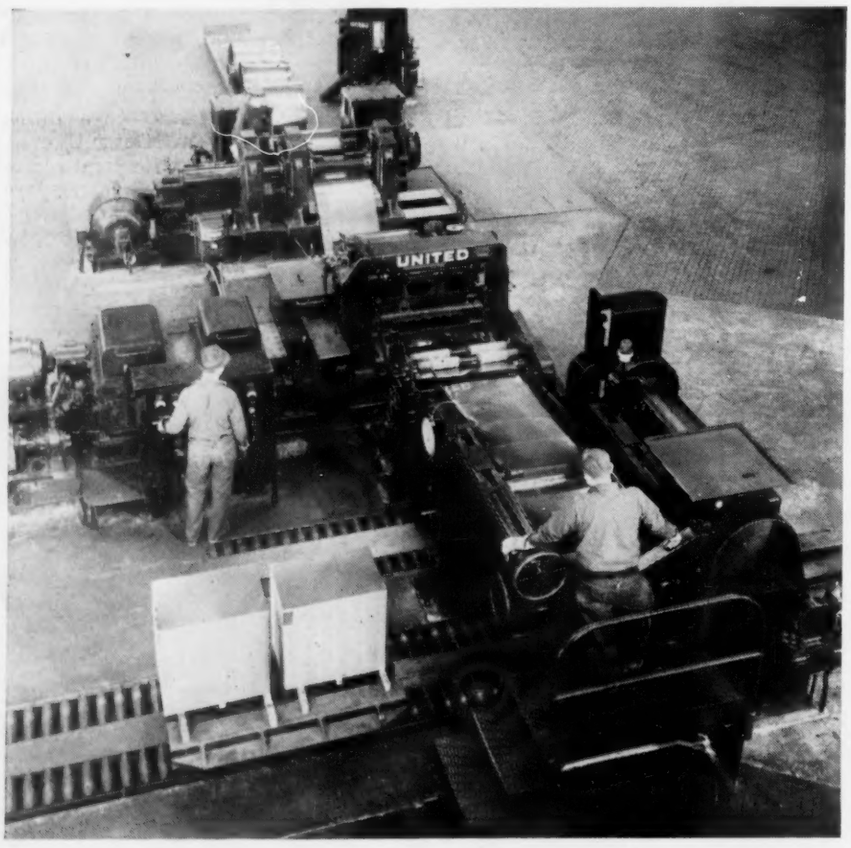
From these cold mills, tin mill coils, 16 to 38 inches wide, move on through three electrolytic cleaning lines to tin annealing furnaces. Eleven gas-fired furnaces with 36 bases are provided. Each base handles 16 coils when stacked two high.

Annealed stock is delivered by transfer cars to the tin temper mill department and then by tractor to the two, 4 high, two stand, 18 and 42½ x 42 inch mills or to a single 4-high mill of the same size. These mills operate at strip speeds ranging from 600 to 1500 feet per minute, tempering strip from 16 to 38 gage as required.

Move To Shear Lines

From these temper mills, coils move on to six flying shear lines. Four of the lines have reciprocating type shears and two use drum type. Special provision is made for disposal of side trimmings. Sheared product is automatically assorted for gage.

Sheared tin plate advances to the batch type white pickler and from there to the tin house where 14 hot dip pots are installed. A continuous hood is provided over the entire battery to carry away fumes. Five tinning machines are 75-inch units. The other nine are 64 inches wide. Tin plate is trucked to the assorting room where it is closely inspected, weighed, boxed and moved on to the warehouse for storage or shipping. Material moves forward in a



Tin shear line shown here has a maximum speed of 350 feet per minute

straight line at all times, never backtracking.

Returning now to the cold reduction department, there is other equipment here for processing pickled coiled stock. In addition to the 5 stand, cold reduction mill used for tin plate and the 4 high, 20½ and 53 x 54 inch, reversing unit which handles coils from 18 to 50 inches wide, there is a 3 stand, 20½ and 56 x 84 inch, tandem mill with a capacity of about 200,000 gross tons of coiled strip per year. No. 1 and No. 3 stands are each driven by 2500-horsepower motors, No. 2 stand having a 3500-horsepower motor. Delivery speeds from this mill range between 450 and 900 feet per minute. It is designed to handle open hearth carbon steel, bessemer steel, Cor-Ten, Man-Ten, Sil-Ten and stainless steel in widths from 18 to 77 inches.

Cold reduced material from these mills is moved by crane or tractor to either a recoiler line which side trims strip 16 gage or lighter, or to three flying shear lines designed for strip 18 to 77 inches wide, 11 gage or lighter. These lines are equipped with 2-high roller levelers, side trimmers and drum type flying shears to cut strip into lengths ranging from 30 inches to a maximum of 15 feet. They operate at speeds from 150 to 450 feet per minute.

Thirty-four, muffle type, gas fired, controlled atmosphere, annealing furnaces with 118 cases and hoods are installed in the cold reduced sheet and strip department. Two of these furnaces, each with three bases, are designed to handle coils up to 54-inch outside diameters and widths up to 77 inches, each base providing space for eight maximum size coils set on end in two rows. The other 32 furnaces are designed for sheet annealing. Two 40-ton cranes and two 20-ton cranes, 120-foot span, are available here.

Cold Finished Next

From annealing, work goes to the cold finishing department where there are three, 4 high, 20½ and 48 x 84 inch temper mills, two arranged for either coils or strip and one for sheet alone. These mills operate at speeds from 150 to 450 feet per minute. Two-high roller levelers are arranged in tandem with these mills. Also provided in this department is a 2 high, 32 x 84 inch, temper mill arranged for either sheet or coils and equipped with a 2-high roller leveler. Supplementing the mills is additional roller leveler equipment, a stretcher leveler, squaring shears, oiling machines, flying and resquaring shear lines, and a combination annealing and normalizing furnace.

Every care has been exercised to assure maximum safety throughout the entire plant and special provision has been made for the comfort and convenience of the workers. All pickling, electrolytic cleaning and tinning lines are covered or hooded to eliminate steam or fumes.

Convenient parking areas are provided near the main entrance to the plant and tunnels under the railroad tracks take the workers directly to the several buildings. Restaurant facilities and a completely equipped hospital are provided. A 30-foot roadway encircles the entire plant and a new road is being built to connect the plant with the state highway system. All shipping departments are provided with convenient truck loading space within the buildings and serviced by overhead cranes. There also is ample track space along car loading platforms.

Study Antimony's Effect On the Strength of Tin

■ Mechanical properties of alloys of tin with 2 to 18 per cent antimony are analyzed in publication A 78 of the International Tin Research and Development council, a paper read recently by Prof. D. Hanson and W. T. Pell-Walpole before the Institute of Metals.

In chill-cast, rolled strip and extruded wire specimens little improvement was obtained by using more than 9 per cent antimony. Effect of progressive amounts of cold-work on brinell hardness was studied in three alloys containing 4.5, 7 and 14 per cent antimony. With the first two, reduction of 10 to 30 per cent caused a permanent hardening where greater reduction caused less hardening and the specimens softened by self-annealing at room temperatures during the following six months. The 14 per cent alloy was considerably harder as chill-cast, but was not hardened by mild reduction and on the contrary was softened by severe reduction, although there was a slight recovery with time.

Effects of various forms of heat treatment were investigated, and it is suggested that grain size is an important factor in work-softening and annealing of these alloys.

Copies of this publication may be obtained free from the council, 149 Broadway, New York.

Top, general view of tin annealing department. Below, entry end of 54-inch reversing mill in cold reduction department

Strip-Mill Lubrication

Necessity of protecting lubricating oils and greases from contamination in use has resulted in improved sealing systems described here in second part of this article

Part II

■ IN THE modern continuous mill designed for pressure oil circulation, the elimination of oil baths and the use of heating elements has materially decreased the importance of the pour test. On the other hand, where the viscosity or pour test is too high the reduced fluidity may develop marked increase in power consumption. This would prevail throughout the system, for not only would the circulating or oil delivery pumps be called upon to do extra work, but also the mill drives might feel the extra duty demanded due to the increase in internal friction within the lubricant itself.

Lubricating oils for the circulating oiling systems employed on certain types of enclosed gearing and the modern sleeve-type flood lubricated roll neck bearing, must be protected most carefully to assure continued lubricating ability. Sludge is the nemesis of the steel mill lubricating engineer who is charged with the maintenance of these bearings.

Abstracted from *"Lubrication"*, published by The Texas Co., New York

So he watches the demulsibility of his circulating oils quite as carefully as he does for his turbine oil. Fortunately, he has two assistants in this connection: The petroleum refiner who manufactures all these oils to a 1620 demulsibility, and the bearing and mill manufacturers who include the most effective methods of sealing against entry of water and solid foreign matter.

Regardless of these precautions, however, water will gain entry. The only recourse, therefore, is to remove it before it can lead to the formation of emulsions and certain types of sludge. In a relatively water-free system sludge can be present in the absence of an emulsion especially in an oil readily susceptible to oxidation. Furthermore, sludges can be either water-soluble or oil-soluble.

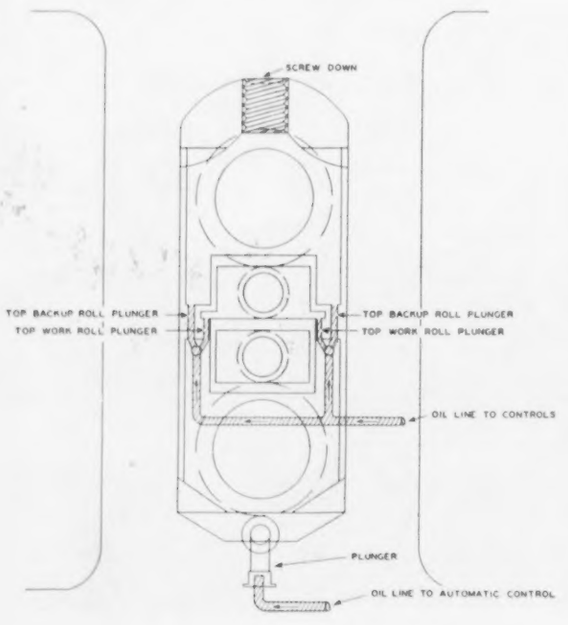
Emulsions are largely prevented by continuous removal of water; along with sludges they can be eliminated by centrifugal purification. Filtration in turn will remove solid contaminants and oxidizable material. The use of the centrifuge plus automatic and continuously cleaned filtration is quite as widespread as the bag or screen type filter.

The amount of water which must be used on certain types of steel mill operations is considerable; furthermore it is usually contaminated. In brief, water is one of the primary agents in heavy duty rolling mill service in eliminating scale accumulation. Much of this water will deluge the bearings and drives. After passing over the hot metal it is dirty and of sufficiently high temperature to work its way into the lubricating system almost regardless of the care in design. Furthermore, at a temperature of very nearly the boiling point, water will have a decided tendency to react physically with any oil with which it comes in contact, to cause formation of permanent emulsions which may be very difficult to break.

Water Sealed Out

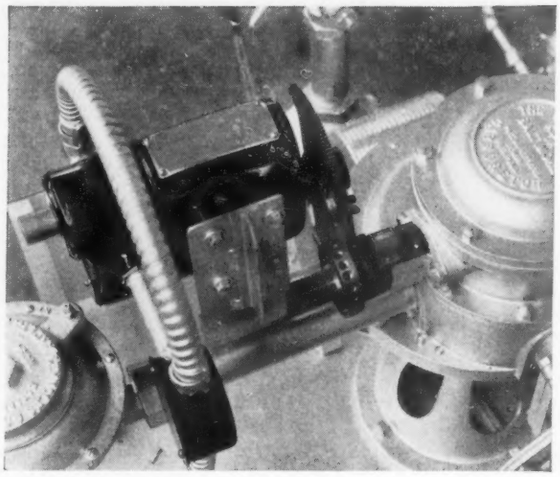
Fortunately, water traps and settling tanks have been found to aid materially in removing a considerable amount of such water before it has time to affect the oil. All points wherein water may gain entry into such a lubricating system should be carefully sealed as added insurance. This can be accomplished in many cases by caulking surface joints with oakum, and covering with molten lead. With bearings, however, attention should be directed to their original design, in order to provide for some recognized method of sealing, which will not impair the free rotation of the shafts.

Modern sealing methods have been carefully studied by the builders to determine their adaptability to the oil lubricated sleeve type bearing. The perfected design of this bearing will rarely permit the entry of an excess of actual solid foreign matter; water leakage, however, may occur, or there may be some accumulation due to condensation. Seal investigation therefore



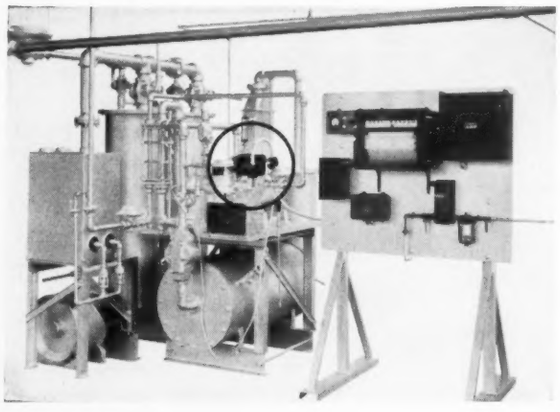
Applying oil pressure to mill rolls assists lubrication. Pressure via plungers to top work and backup rolls is constant during operation. Pressure on fifth roll varies, automatically being maximum on starting and stopping

Absolutely, Mr. Gallagher!



The slightest variation in gas analysis from the pre-determined norm actuates this full-floating motor drive (above) correcting the micrometer adjustment of the proportioning valve to meet the changed conditions.

Below, the C.A. Monitor installation operating the smallest Kemp-Atmos Gas Producer, Model 1 MA, 1000 CFH capacity.



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This latest Kemp refinement in bright annealing assures you the desired atmos-gas analysis without variation by *automatically* compensating for changes in the three hitherto uncontrolled variables:

1. Specific gravity of fuel gas.
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Built for any atmosphere generator, this new Constant Analysis Monitor is recommended with the Kemp Atmos-Gas Producer. *For special bulletins on Atmos-Gas,* address, **The C. M. Kemp Mfg. Co., 405 East Oliver Street, Baltimore, Maryland or Oliver Bldg., Pittsburgh, Pennsylvania.**

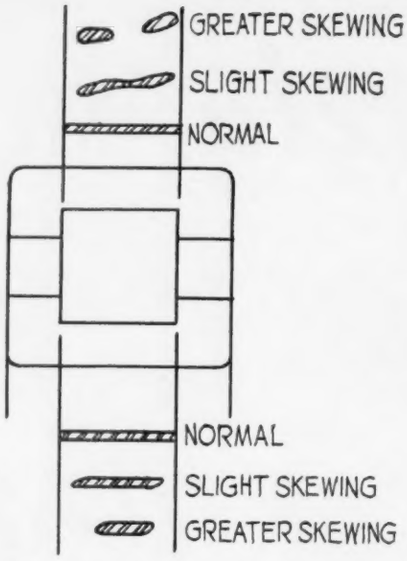
KEMP of BALTIMORE

has been directed towards reducing this water content. As already stated, brass rings, the rawhide or leather cup, and the compression type of rubber seal, have all proved their adaptability and are standard equipment today for the protection of such bearings.

The result has been very gratifying. Whereas but a few years ago it was expected that up to twenty per cent of water might gain entry and that at least part of the oil would most surely become emulsified; today, from two to four per cent is regarded as a high maximum, and the most modern installations report an even lower water content in their service oil.

It is obvious that these improvements in the mechanical structure of this bearing are of inestimable benefit to the oil industry, in that the load imposed upon their lubricating oils is materially reduced.

As a result, the normal water content in a modern finishing mill oiling system will be low—usually well under one per cent. In the lubrication of edger gear sets and the roll necks on the roughing mill, a much greater water content may prevail, due to the huge volume of water which is continually being discharged over the slabs. The centrifuge or settling tank must remove the majority of this water if the mill is to function effectively. Any failure may lead to rapid accumulation of sludge and possible loss of a roll neck bearing. When we consider that the latter may cost upward of $1000, obviously the management is sympathetic to the lubricating engineer's plea for every possible means of protection.



Showing effect of skewing in a roller bearing. For roller to make use of its full contact area, it must be kept exactly parallel with shaft. If this contact area is disturbed, above indicates its resulting appearance and potential effects upon wear. Drawing courtesy Marlin-Rockwell Corp., Jamestown, N. Y.

Hence the provision for standby oil storage tanks; the use of several thousand gallons of oil circulated at a rate of 300 to 350 gallons per minute; and a multitude of indicating devices coupled with the reclamation system to keep the roller and lubricating engineer constantly advised of the performance of this system.

Mechanized lubrication of steel mill pinions and gears has likewise progressed to a marked degree. The trend towards the enclosed and oil-tight housing; improvements in gear tooth cutting and fitting, and the perfection of circulating oiling systems, is noteworthy. In fact, the cumbersome exposed gear is a novelty in a modern continuous mill; all the necessary speed reduction mechanisms are as carefully housed as are the bearings, and usually the oiling system for each is so similar that one must be thoroughly experienced to tell them apart. All this has developed from the necessity for higher mill speeds with reduced gear tooth wear, less noise and greater cleanliness.

But not only are the roll stand gear and bearing lubricating systems alike; frequently they are designed to function on the same grade or type of oil. It is better, however, to serve each individually due to the usual differences in operating conditions and the variations in rate of oil circulation which may be necessary.

Oils for this work, however, cannot be regarded as all-service, enclosed gear lubricants. The design of the gear set becomes an influencing factor. In other words, some gears and pinions may be designed for extreme pressure conditions; they require specially prepared oils of high film strength, containing components capable of temporary chemical reaction (under high temperature and load conditions) with the surfaces of the gear teeth. By this reaction an auxiliary protective film is formed momentarily to prevent actual clean steel contact and subsequent tooth scuffing.

Oil Must Be Protected

In service of this nature the oil must be constantly protected against abnormal contact with water, otherwise corrosive salts may be developed, and the protective ability of the oil impaired.

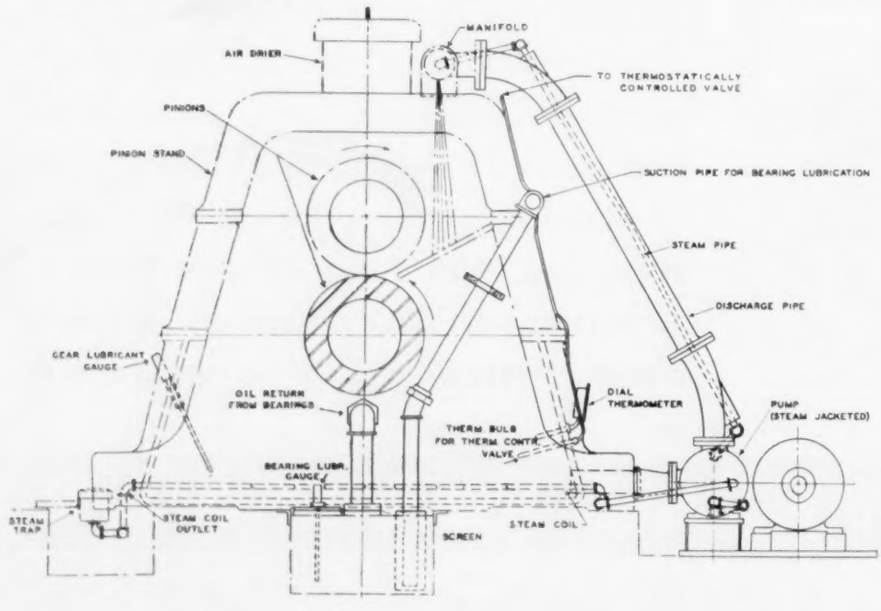
The screw-down, which functions as the control element for the roller in regulating the amount of reduction developed by any roll stand, is another mechanism wherein the intensity of the load conditions may require the use of an extreme pressure lubricant.

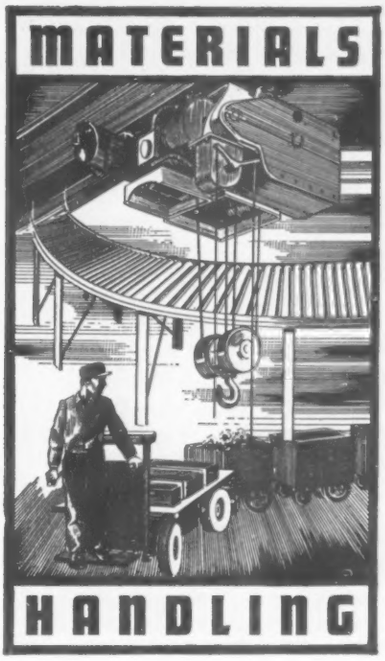
In the lubrication of the screw-down, one must counteract the effects of heat and pressure. The latter is reactive, and developed to a maximum at every pass of steel through the rolls. Radiated heat from the hot steel is meanwhile tending to reduce the body of any lubricant which is applied to the screws to render it sufficiently fluid to flow quite readily.

The principles of hydraulics are made use of in the modern mill to facilitate initial lubrication when the rolls are started, and to reduce the direct load when stopping. This is

(*Please turn to Page* 67)

Lubrication piping for a Falk 20 x 36 pinion stand. Use of thermostatically controlled preheating system is an advantage in cold starting. System also can be used to cool lubricant in extremely hot weather





Work Progression

Heavy machine-tool production is aided by carefully organized system described here which shows remarkable efficiency. Trucks, jib cranes, overhead cranes used

By **LOUIS J. BAUDIS**
The Bullard Co.
Bridgeport, Conn.

■ EFFICIENT progression of work through a plant is easily attained with consumer goods adapted to straight line production. Production on the so-called straight line basis generally is not feasible in capital goods industries but unquestionably results in greater economies when adapted to the fullest extent possible. Work progression in plant of The Bullard Co., Bridgeport, Conn., has been developed to take advantage of production in stages to a remarkable degree, especially when it is considered that this company specializes in two types of heavy equipment—vertical turret lathes and multiple spindle boring and turning machines.

Speaking in a broad sense there are three principal types of work progression: Continuous or straight-line, intermittent and lot-repetitive. The continuous plant operates with a few raw materials which pass consecutively through a group of machines or processes arranged according to sequence of operations.

The intermittent type takes a greater variety of raw materials, fabricates them to some desired condition and stores the semi-finished or finished parts until market demands require their completion. Products may cover a wide range of character and size. Machines here are usually arranged in departments in accordance with their function and capacity.

The lot-repetitive plan permits the periodical passage of large lots to a finished stores section. Here factory equipment is arranged to permit effective use of quantity production with continuous flow introduced as far as possible. Nature of finished products usually does not vary as much as in the intermittent method.

Bullard's plant is an excellent example of a well managed industrial unit functioning on a modified lot-repetitive plan, employing the principles of mass production and interchangeable manufacturing as far as they prove economically sound. This plant normally employs 1300 men. The engineering department determines specifications as to design, sizes, and materials of all parts. The standards department, functioning as a sub-division of engineering, determines the best plan for manufacturing. Production department, guided by incoming sales volume, determines the scheduling of all work. It will be seen that the standards department constitutes the backbone of the Bullard work-progression system.

To maintain positive control, the standards department includes the

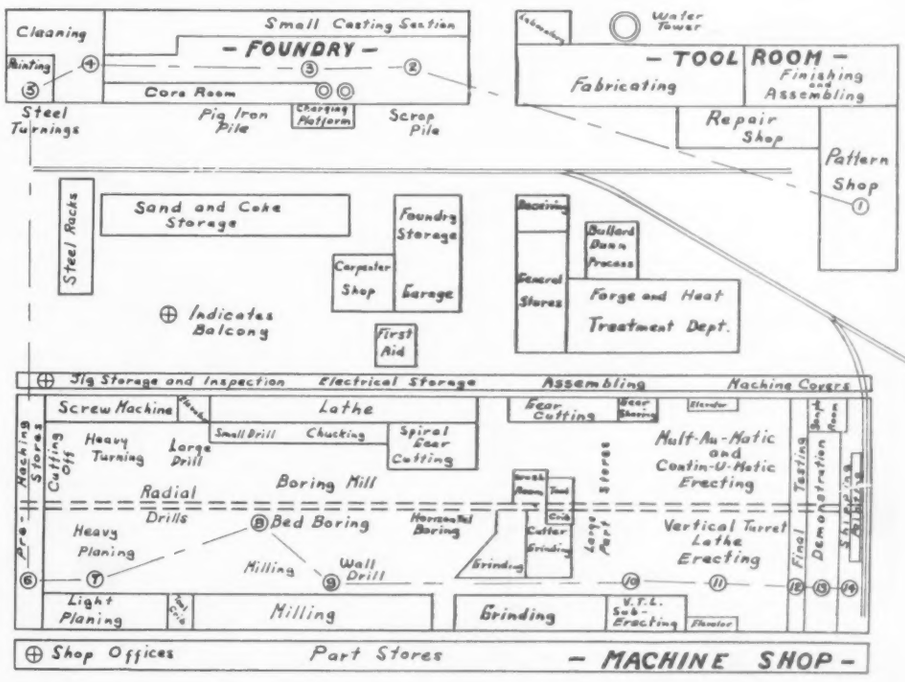
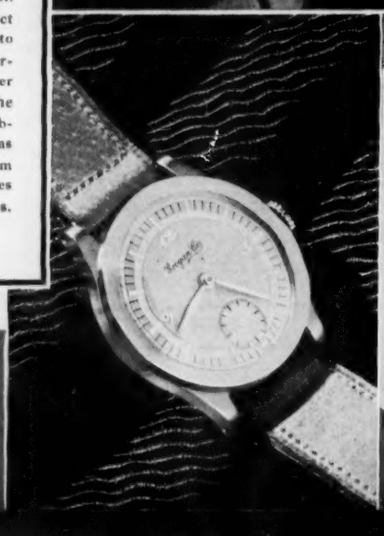


Fig. 1—Layout of plant including foundry, tool room and main machine shop. Successive steps followed by a machine bed are indicated here

WATCHES OR PENS OR CAMERAS—buyers expect them to tell time or write or take pictures for years, and still look smart and trim. That's why they favor articles like these made wholly or in part of stainless steel. That's how stainless helps your product to move faster, to return more profits to you. This watch case, proof against tarnish, is also proof against dust and water because it is so accurately machined. The pen point costs less than gold, is less subject to accidental injury, and is just as resistant to corrosive inks. The trim keeps this camera looking new, reinforces the case to protect vital interior parts.



AN *Extra* SALESMAN WITH EVERY POUND OF U·S·S STAINLESS STEEL

GIVE a product stainless steel, and you give it a competitive advantage that speeds its flight . . . from factory to jobber . . . from jobber to dealer . . . from dealer to customer.

The salesmanship of stainless steel is the soundest you can employ. For the appeal of stainless is universal.

BECAUSE IT ALWAYS SPARKLES, looks attractive, smart and modern, it appeals to those who buy for looks.

BECAUSE IT IS VIRTUALLY INDESTRUCTIBLE, the strongest of all known commercial metals, it attracts the buyer who wants the greatest value for his dollar.

IT ATTRACTS LUXURY BUYERS because, like gold and silver, it never fails to reflect quality, whether in office, kitchen, factory, or dining room.

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Makers of scores of highly competitive articles, companies known the world over for their progressive salesmanship, are using stainless steel. As a medium for trimming, it gives their products permanent, blemish-free beauty. Used in vital parts, it makes products stronger, lighter, more efficient.

Either way, the buyer profits. And because the buyer profits, the maker profits too. In every case on record, the adoption of stainless steel has been followed by increases in sales.

Speed your sales with Stainless

Whenever you want to give new life to an old product, whenever you want to boost lagging sales, take advantage of the selling punch of stainless steel. Put that extra stainless "salesman" to work for you. Write us freely about any application you are considering. Our specialists will gladly work with you to achieve the results you desire.

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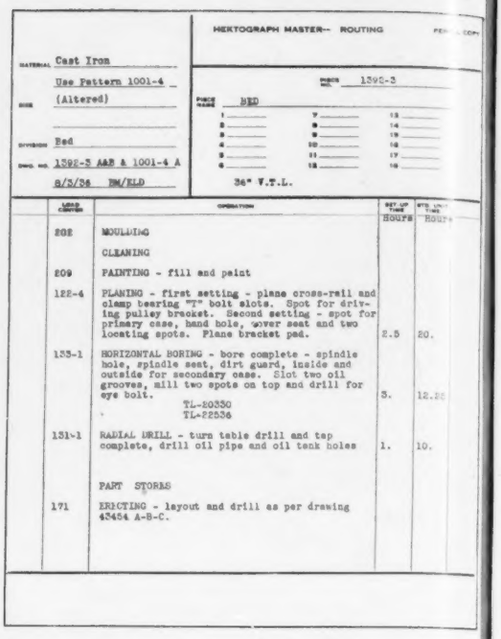
Columbia Steel Company, San Francisco, *Pacific Coast Distributors* · United States Steel Products Company, New York, *Export Distributors*

UNITED STATES STEEL

Fig. 2—Final erection, testing and demonstration of multiple spindle boring and turning machines is helped here by jib cranes suspended from individual floor columns



HEKTOGRAPH MASTER— ROUTING

MATERIAL	Cast Iron
SIZE	Use Pattern 1001-4 (Altered)
DIVISION	Bed
DWG. NO.	1392-S A&B & 1001-4 A
	8/5/36 RM/ELD

PIECE NO. 1392-S
PIECE NAME BED
36" V.T.L.

LOAD CENTER	OPERATION	SET UP TIME Hours	STD. UNIT TIME Hours
202	MOULDING		
	CLEANING		
209	PAINTING - fill and paint		
122-4	PLANING - first setting - plane cross-rail and clamp bearing "T" bolt slots. Spot for driving pulley bracket. Second setting - spot for primary case, hand hole, cover seat and two locating spots. Plane bracket pad.	2.5	20.
133-1	HORIZONTAL BORING - bore complete - spindle hole, spindle seat, dirt guard, inside and outside for secondary case. Slot two oil grooves, mill two spots on top and drill for eye bolt. TL-20330 TL-22536	3.	12.30
131-1	RADIAL DRILL - turn table drill and tap complete, drill oil pipe and oil tank holes	1.	10.
	PART STORES		
171	ERECTING - layout and drill as per drawing 43454 A-B-C.		

Fig. 3—Master routing card covering operations on machine bed, path of which is traced through various departments by Fig. 1

following functions: routing, methods (both direct and indirect), time study, tooling and cost.

Routing section develops a master route card, Fig. 3, for each part. This card lists material to be used, each consecutive operation, time required for setting up the piece on each machine and time required for completion of each specific operation. The two main principles are that the piece produced shall fulfill all engineering requirements and that it shall be turned out by the most economical method.

Section on routing is provided with complete details on materials, methods, cost and experimental data. Backed by accumulated experience, it is able to incorporate the best current practice in each part. Tooling of pieces is requested by the same division. Prospective number of pieces usually determines whether complete tooling will be supplied. In all cases requests must be endorsed by the engineering department which has full information as to possible future requirements for that part.

Master route card is employed whenever parts are needed by the production department which determines quantity, rate of flow of work and complete scheduling to avoid choke points. A shop tag or envelope, bearing duplicate information and blueprints to supply all details, is sent into the shop system with a requisition for the necessary material which then flows through the plant in accordance with the designated operations.

Time study division now gets the master card and sets a standard time for each operation. Since this division has carefully followed the principle of time study and recording of elemental times, combined experience and recorded data make it possible to set accurate standard times without actual time study of operations on each piece. This system permits standard time on all operations on all parts, an impossible condition if every part required time study for approximately 58,000 master cards are filed. The plant operates on a bonus system with a guaranteed hourly wage. A bonus is paid for all efficiency better than 75 per cent, based on standard time for each operation.

Methods division concerns itself

Fig. 4—West bay looking north. Here multiple spindle boring and turning machine parts are machined

Metal parts for these famous machines are cleaned with ORTHOSIL

TRADE MARK

L C SMITH & CORONA TYPEWRITERS INC. is a firm that has long been known for typewriters and office machines accurately built and handsomely finished. In the exacting manufacturing operations of the Groton Plant of this company, an important problem is the effective cleaning of steel parts prior to finishing. Heavy coatings of cutting oils had to be removed rapidly, completely—and economically.

For this purpose, Orthosil was selected as the metal cleaner. Not only did it prove its speed and thoroughness in removing grease and oil, but it substantially reduced the cost of the alkaline cleaning operations. A far smaller quantity of Orthosil is needed to do a better job.

This has been the experience of many leading manufacturers when they change to Orthosil. The advantages of this product are definite, and can be demonstrated in your plant. Why not try Orthosil, and check it against other alkaline cleaners? Write for full details. Address Department F.

PENNSYLVANIA SALT MANUFACTURING CO. · Est. 1850
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New York · Chicago · St. Louis · Pittsburgh · Tacoma · Wyandotte

- Particularly effective in electrolytic cleaning due to its high conductivity
- Assures quicker action than other alkalis
- Prevents grease and dirt from re-depositing
- Easy to pour, quick to dissolve
- Dry—highly concentrated—economical
- Quickly removes the grease, soot, dust and various other kinds of dirt unaffected by pickling acid
- Leaves material *clean* for further processing

PENNSYLVANIA SALT *Chemicals*

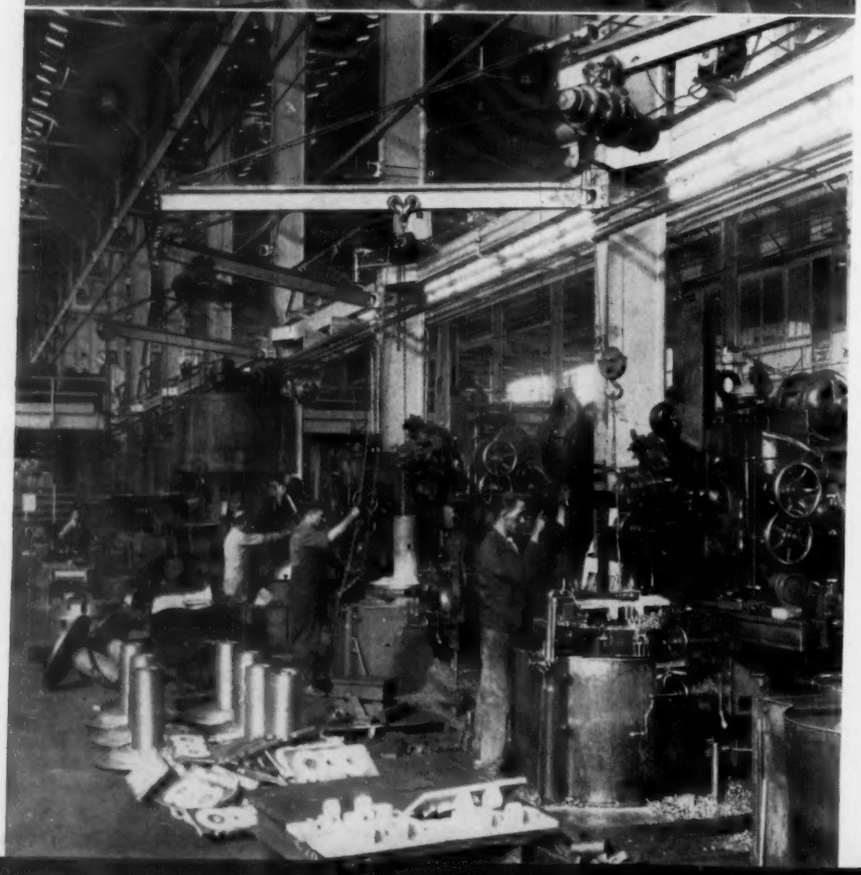


Fig. 5—(Top)—Electric lift trucks expedite handling of small parts. Fig. 6. (Center)—Cores for large molds being put in place in foundry. Fig. 7. (Bottom)—Section of vertical turret lathe department showing turning operations. Here work is handled by powered jib cranes

with study, development and improvement of means to perform work of both direct and indirect nature. When more efficient methods are developed they are submitted then to the head of the standards department, who takes the steps necessary for their incorporation in the company organization.

Fig. 1 shows general plant layout. Pattern shop is a 3-story building where work is efficiently handled by monorail hoists, power trucks and elevator. Wood is brought in by both rail and truck and is stored on the main floor where equipment also is provided for making large patterns. The second floor is devoted to making all other patterns. Work benches are placed at right angles to the walls thus providing excellent light. Standard woodworking machines, individually driven and placed in center of floor area, are readily accessible to all men. Third floor is used for storage of obsolete and small patterns. All large patterns and some small ones in frequent use are stored directly across from the foundry.

Castings Vary Widely

Foundry building is a double-bay structure. Central section is used to make large castings. Work is handled by five overhead cranes (two 20-ton and three 10-ton), jib cranes and railed trucks. Bullard requires castings ranging from approximately one to 21,000 pounds. To produce such a range efficiently, both dry sand and green sand molding are employed. Raw materials, scrap (largely turnings) and flasks are stored adjacent to the building. Raw materials are conveyed to the two cupolas by overhead cranes.

West bay of foundry building is devoted to nonferrous and small iron castings. It is established practice to make green sand molds in the morning and pour early in the afternoon. Sand is remixed and prepared during the night so molding may be resumed the following morning. This bay is served by three powered cranes, one hand crane and electric lift trucks.

East bay is split by the two cupolas. North section is devoted to bench work, making gibs and other quantity small parts. Section south of cupolas is for core-making and includes two powered overhead cranes. A high pressure water sys-

(*Please turn to Page* 67)

Creative Craftsmanship

Phoenix Rolls are examples of the creative craftsmanship of the engineer. That is why Phoenix Rolls have progressively improved through the years. That is why they represent not merely the experience of the past, but also the demands of the future.

The bronze Colossus of Rhodes, one of the wonders of the world, represented the sun-god, Helios. The sculptor was Chares, artist turned engineer. Made about 280 B.C., the statue reared its 120-foot height until 224 B.C. when an earthquake toppled it and its pieces lay strewn about for nearly 1,000 years.

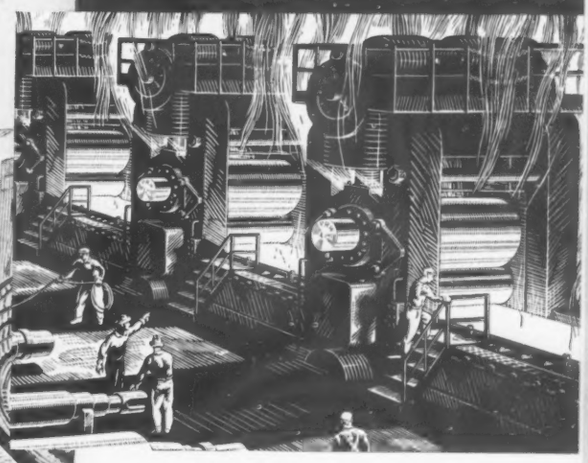
PITTSBURGH ROLLS

Division of

BLAW-KNOX CO.

Pittsburgh, Pa.

"Steel's Partner"



PHOENIX STEEL, for unusual strength; PHOENIX "A" (steel alloy) for strength and wear; PHOENIX METAL—PHOENIX "K" for strength, wear and finish; PHOENIXLOY (uniformly hard) for flat rolling where high finish of extremely thin gauge of material is required to be free from all marks and defects. Also tube mill rolls of quality material best suited to the kind of service required; PHOENIX CHILL, PHOENIX NICKEL CHILL, for all flat rolling requiring finish.

ROLL MAKING IS AN ART!

Different Steels Show Almost Same Fatigue Endurance Values

■ AMONG THE many subjects covered in papers at the 59th annual meeting, American Society of Mechanical Engineers, New York, Dec. 5-9, were included studies on endurance and loading of springs, friction, creep testing, dust explosions and trends in design of railroad equipment, marine power plants and others.

According to C. T. Edgerton, Crucible Steel Co. of America, New York, fatigue endurance of helical springs formed from plain carbon, acid, basic and electrical steels is fairly uniform as indicated by tests at Wright Field, Dayton, O. There is slightly less than 5000 pounds per square inch difference in stress resistance of the four materials.

Fatigue Points Vary

Basic electric steel has a fatigue endurance of close to 98,000 pounds. Other steels fall short of this mark by from 2000 to 4000 pounds, the latter applying to acid steel which of the group tested has the lowest stress resistance. Identical treatment as to cycles and other factors are given; also effect of centerless grinding and tests with an as-rolled bar with special treatment of the billet from which the bar was rolled. Failures occurred two or three coils down from the end coil, although in some instances the end coil gave first. The principal stress to which helical springs are subject is torsion and these tests are being made with the view of establishing data for best types of steel materials for specific requirements.

Deflection of helical springs under transverse loadings was discussed by W. E. Burdick, engineer, General Steel Castings Corp., Eddystone, Pa.; F. S. Chapin and W. L. Sheppard, structural engineers, Stainless Steel division, Edward G. Budd Mfg. Co., Philadelphia. They made an analytical approach to the problem of the transverse deflection of a helical closely-coiled spring under the action of a force perpendicular to its axis. It appears from the results that for the majority of engineering applications of compression springs subjected to transverse loading the ratio of actual to calculated deflection versus the ratio of working height to the mean diameter is less than 1.5. With springs in excess of this ratio there is a possible danger of approaching the limit of stability. However, the extent to which the instability and end-coil conditions weaken the validity of data can be appraised only qualitatively. It is pointed out, however, that with multiple-spring suspensions, it is possible to dispose the various coils so their lateral deflection components may counteract.

Completion of notable railroad equipment in a recession year features progress in railway mechanical engineering, several outstanding developments being outlined by E. G. Young, chairman, Railroad division. Locomotives for passenger service are being increasingly streamlined. Current trends in railroad equipment are streamlining, partial articulation, high efficiency brakegear and reduction in weight which results in greater use of alloy steels and aluminum alloy. A new high in power of Diesel-electric units has been attained and higher power for passenger locomotives continues. Diesel-electric units are being built in greater numbers for switchers. To decrease tare and increase net capacity within prescribed rail loads, efforts are centered in weight reduction in freight cars. Abroad, the continual expansion of the internal-combustion engine is notable as shown by the larger number of Diesel-powered units with special trailers, extremely light weight and greater use of articulation.

Among the locomotive structural features, four developments have been important: The cast-steel locomotive bed has attained greater dimensions; a rival type of construction with the locomotive frame being profiled from a slab of rolled steel by flame-cutting process is making some headway, however. For both replacement and new construction, French railways have developed a satisfactory all-welded cylinder. Doubled disk, driving wheel centers have been generally adopted for new heavy power constructed in this country; also many wheel castings simulate in appearance the spoked wheels which they replace. Superiority of axles with rolled-surface finish when worked to service stresses is clearly indicated by developments in equipment for fatigue testing full-sized axles. This leads toward solution of design problems in which theoretical treatment has never been satisfactory.

Lightness Increases Efficiency

An immediate effect of weight saving in locomotives or cars is either a reduction in horsepower miles and corresponding costs or an increase of train capacity and pay load for a given schedule, according to R. Eksergian, consulting engineer, Edward G. Budd Mfg. Co., Philadelphia, who discussed motive-power characteristics and lightweight equipment. In the final analysis the adoption of one type of power unit over another depends on its economic justification, Mr. Eksergian declared. Since the performance of a horsepower is only slightly effected by the type of power unit, a primary factor is the cost per horse-power mile. He held the view increasing costs of superior performing power units can only be justified to the extent of their increased availability and to where in the operation of a carrier such availability can be utilized.

Electric Locomotive Trends

Trend in recent design and practice in electric locomotives was outlined by B. S. Cain, General Electric Co., Erie, Pa. For some years there has been a steady tendency toward either all cast or welded construction of truck and cab frames in this type of locomotive. Use of high strength steels has also gained ground with weight saving as a factor. Chief advances in cab construction have been in devising streamline contours which can be built without excessive manufacturing costs and in developing technique of welding cab frames and sheets for smooth appearance and adequate strength.

Balancing of reciprocating weights in steam locomotives was reviewed by A. I. Lipetz, chief consulting engineer, American Locomotive Co., who discussed the percentage of balancing reciprocating weights and how this depends on method of calculating counter-balancing, static or dynamic. He showed, on the basis of existing locomotives, that a smaller total percentage of counterbalancing reciprocating weights of a locomotive is quite adequate for modern locomotives.

Mr. Lipetz called attention to the existence of the steam component on the main axle and suggested no reciprocating balance should be placed on main wheels, even if this should somewhat reduce the total percentage of balancing. He would rather increase the dynamic augment on coupled wheels in order to spare the main wheels from excessive blows. In his opinion the disregarding of the action of the steam component is responsible for the objection of some railroads to cross-counterbalancing of locomotives. This attitude should disappear when the problem is clarified.

Under the subject of thin oil films, Walter Claypoole, Beacon, N. Y., research physicist, The Texas Co., described a method for depositing thin lubricating oil films of any specified thickness on polished metal by converting the oil into a highly dispersed fog, largely consisting of positively charged particles. Oil is then

readily deposited on a negatively charged metal surface at a rate depending on the oil potential gradient at metal surface and the concentration of oil particles in the fog. Rate of deposition is best determined by observation of progressive change in the interference color produced over a varied thickness range. Comparison of color with a standard stepped film of varium stearate gives a high degree of accuracy in determination of film thickness. The low value of the coefficient of static friction is a measure of the oiliness value of an oil-metal combination, according to Mr. Claypoole.

When started or brought to a standstill, boundary or semifluid friction takes place in bearings of practically all rotating machines and L. M. Tichvinsky, research engineer, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., discussing wear in lubrication problems, described several wear-testing methods with appropriate machinery developed to test such wear. Mr. Tichvinsky noted this type of friction, lasting but a brief period of time, is usually accompanied by wearing of the bearing surface, the journal surface, or both; also in the case of antifriction bearings, due to sliding, rolling or combination of both. Other causes for wear are dirt, inadequate lubrication and misalignment.

Urging prevention and giving several systems involving such practice, Hylton R. Brown, bureau of chemistry and soils, U. S. department of agriculture, spoke on control of dust explosions in industrial plants. Use of inert gas is effective in some industries producing dust. Venting areas, fixed glass vents, scored glass vents, movable vents and safety codes were suggested for specific cases. Mr. Brown said that with few exceptions any dust which will burn or oxidize readily and is fine and dry enough to form a cloud in the air, will explode if the concentration is within certain limits and there is present a source of ignition.

Industrial Accidents Analyzed

Factory layout and safety was the topic of F. J. Van Poppelen who said accidental injuries in industrial occupation were distributed as follows: handling objects, 26 per cent; falls, 20 per cent; stepping on or falling against objects, 6 per cent; falling objects, 8 per cent. The remaining percentage of accidents is attributable to machinery, vehicles, hand tools and miscellaneous.

Cost of apprenticeship was discussed by Warner Seely, The Warner & Swasey Co., Cleveland. "As far as I know there are no general figures available on the cost of apprentice training," said Mr. Seely. "Speaking specifically of our experience since the reestablishment of our 51-year old training program after a brief and regretted interruption in the three worst depression years, I can state that it has not added a dollar to our expense of doing business. Our apprentices, averaging 45 in number, have been producing more than enough in the shop to pay their own wages (an average of 45 cents an hour), four hours of school time, as well as 36 hours of shop time each week.

"Their actual production is more than enough to carry this, plus the expense of supervisory salaries and of special tuition at Case School of Applied Science when work is slack. We feel that we could even charge a portion of foremen's salaries to the program and still break even. Careful analysis of shop performance developed the fact that there is a loss of 9 per cent in production through the lower efficiency of trainees and any calculation takes this into account. Also, as the accountants would remind us, there is a corresponding loss in overhead on all equipment in use by apprentices, but our study recognizes that, too."

Better Boilers

Lester M. Goldsmith, chief engineer, Atlantic Refining Co. predicted greater efficiency and economy would be achieved through a new application of high pressure, high temperature boilers in vessels of the American merchant marine.

Mr. Goldsmith reported steam pressures as high as 625 pounds a square inch and temperatures ranging up to 855 degrees Fahr. successful on a recently constructed tanker of his company. This is important because pressures have not been permitted to rise much above 200 pounds in merchant marine boilers. It may result in considerable improvement in efficiency of marine power plants.

Equipment and method for testing models of piping installations to determine the forces set up in the full-size installation due to expansion were described by Harold W. Semar, mechanical engineer, Westinghouse Electric & Mfg. Co., Philadelphia. This problem of expansion, he said, is especially important in modern central-station power plants where the main steam line carries steam at 1200 pounds and 925 degrees Fahr.

The method for testing models of piping installations consists in fixing one end of the model in a slide which can be moved a measured amount, and then measuring the forces at the other end by means of a fixture which holds that end rigidly in place and permits measurement of six forces in three co-ordinate planes, which are the equivalent of forces in co-ordinate directions plus moments in co-ordinate planes. Slide of the movable end is placed so that its direction of motion coincides with the direction of the pipe extension.

A committee report of creep tests on tubular members was submitted by F. H. Norton, Massachusetts Institute of Technology, Cambridge, Mass. Data covering direct comparisons of creep under biaxal stresses with flow in the same metals at corresponding temperatures under direct tensile stress were discussed; also figures covering a correlation of tensile-creep tests and internal-pressure tests.

Fusing temperatures of various kinds of coal ash, and slag and their significance with respect to furnace temperature, operation and design, were discussed by E. T. Bailey, vice president, Babcock & Wilcox Co., New York. He suggested a method of comparing furnace operating results, which consists of taking accurate gas temperatures throughout a furnace, then calculating from them the rates of heat absorption in different zones and calculating an equivalent "heat-receiving-surface temperature" for each zone.

As further steps in the method, he proposed the taking of samples of ash and slag from different portions of a furnace and determining the fusing-temperature range from such samples, then plotting these data as a "gas-ash temperature graph" against heat absorbing surface, comparing the data with observed behavior of ash and slag in the furnace and then finally comparing different furnaces, different coals and methods of operation through the use of such graphs.

Adds Protective Clothing

■ Developed to help industry solve its safety problems, a new and complete line of protective clothing has been introduced by American Optical Co., Scuthbridge, Mass. These products are designed to protect workmen from heat, fire, acids, cuts, etc., and include such items as gloves, sleevlets, leggings, aprons, hats and hoods. It has been announced also by this company that special items for protection under unusual conditions can be obtained.

Enamel Resists Solvents

■ A new porcelain-like, short-bake, synthetic enamel, known as Vitra-Carlite, has been introduced by Hilo Varnish Corp., 42 Stewart avenue, Brooklyn, N. Y. It is said to cover fully in one coat and may be applied by brush, spray, dip or tumble. Resistance to chemicals, especially solvents, and surface hardness are other qualities claimed for this enamel.

Tramrail Systems

Arch rails are produced in continuous setup where low and high-carbon material is preheated, welded and distortion controlled by rolls. Fixtures handle wide range of work

■ MANUFACTURE of tramrail cranes and track at Cleveland Tramrail division of Cleveland Crane & Engineering Co., Wickliffe, O., occupies a building 360 x 185 feet which adjoins the main crane shop and other buildings at this plant. Tramrail division of the company is kept entirely apart from other activities as separate engineering, production and sales organizations are maintained. Operations in this division reached an all-time peak in 1937 with production of some 952 cranes from 1000 to 6000 pounds capacity.

A most important item manufactured in this division is the arch-beam rail over which the cranes, carriers and hoists operate. The basis of Cleveland Tramrail materials handling systems is this rail which is a special rolled section of high carbon and manganese content, having a raised tread to prevent peening by carrier-wheel travel. Arch-beam rails are made by electric welding this standard rail to standard I-beams from which inverted, half-moon sections have been stamped out as shown in Figs. 1, 2 and 4 as well as 6 and 7. Referring to Fig. 1, it will be seen that this design can be punched with little scrap by interleafing the half-moon points.

Upper sections employing this distinctive design are stamped from standard I-beams stored in an outdoor area immediately adjoining the building and just opposite the press in Fig. 3. Beams are placed on a roller conveyor outside the building, fed through an opening in the building wall directly into the press, Fig. 3. The die cuts slightly over one unit per blow to overlap, and the press indexes the beam at each stroke. Full mill lengths of beams are accommodated. As beam emerges from press, it rolls out on another conveyor inside the building and is stacked near the special welding machine shown in Fig. 2.

This is a high production setup

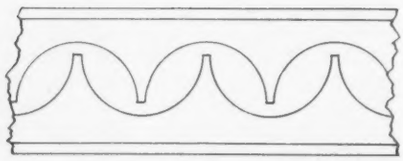


Fig. 1—Arch-rail design produced by stamping press

made especially to weld the tramrail beams in full lengths as received from the mill. These beams are made up in various depths and cross-section sizes to accommodate loads up to 5 tons on hoists or cranes which may be operating on the Tramrail system. This means that certain parts of the welding machine must be adjustable to provide for various sizes of beam.

Upper section of arch beams is plain, low carbon, mild steel. Lower portion is a special rolled T-section containing from 0.45 to 0.55 per cent carbon. This is necessary to provide sufficient hardness to resist the wear of wheels operating over the track and to furnish sufficient strength to prevent deformation under the concentrated loads produced by the wheels. Load concentrations, however, are reduced to practical limits by increasing number of wheels on the large capacity cranes and hoists which operate over such track.

Both upper and lower sections of the arch-beam rail are fed into the welding machine continuously by means of two sets of drive rolls, one

Fig. 2—Setup for continuous welding of arch-rail sections

● In the face of today's stiff competition and narrow profit margins, the conventional order of executive operation is changing. The organization chart, like production machinery, is being modernized for lower costs and improved products. Reorganization is not only desirable, it has become compulsory in order to provide more jobs, more earnings and profit for everybody.

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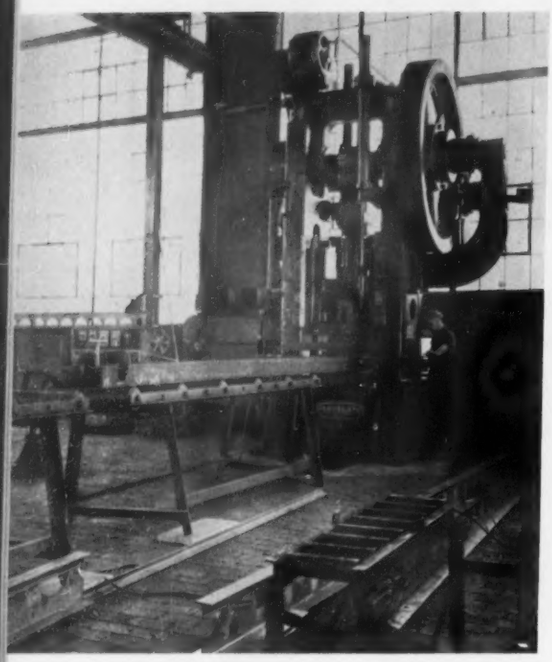


Fig. 3—Press in which arch-rail design in Fig. 1 is produced

at entering end and one near exit end. Drive is from constant speed motor, through gear reducer and chain belt to rolls contacting beam. Both sections enter the machine at the left rear of Fig. 2 and first pass through a preheating chamber in which three electric heating elements maintain a temperature of 300 to 350 degrees Fahr. This preheat is necessary as a low carbon piece is to be welded to a high carbon piece. Heating chamber is insulated and temperature is controlled automatically by thermostats.

Welded by Two Operators

Two arc welding operators join the web of the arch rail to the bottom rail section, one welding at each side of the rail. They work at a point just past the heating chamber where the material emerges from chamber. This opening is shaped to provide just sufficient clearance for the beam and so retains heated air in the chamber. In Fig. 2, this welding position is at the left opening in the main frame just to right of heating chamber and not at end of machine where the operator is shown standing. Work moves continuously through the machine at a rate which will average about 4 feet per minute. Operators employ 220 amperes direct current with shielded type electrodes in welding rail here.

From the welding position, beams move through rolls in the machine which tend to keep down distortion during cooling. However, when beams have reached room temperature, they are again straightened to eliminate the small amount of distortion which results regardless of how carefully the welding is accomplished.

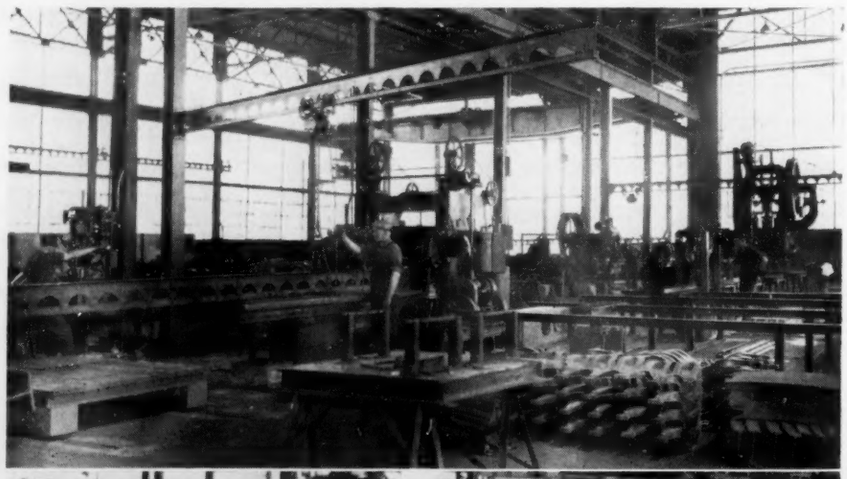
Complete arch-beam rails are now in full lengths. They are painted to protect against corrosion and are stored ready for shipment. Beams are not cut into pieces smaller than a full length until ordered for a specific job or until required for fabricating cranes, switches or numerous other standard or special units.

Fig. 4 shows several types of saw cutters and shears used to cut rails. Portable roller conveyors and permanently mounted floor structures shown in Fig. 4 also aid in handling rails during cutting operations. Overhead jib cranes, it will be noted, employ sections of arch rail and are mounted on vertical supporting columns to facilitate handling material throughout large areas surrounding each machine.

Fig. 5 shows an interesting setup employed in assembling overhead structures used to support various Tramrail switch assemblies. These structures are box frames made from U-channels as shown. This particular fixture employs a series of clamps which fit into slots on the main fixture frame to hold the box sections in position for welding. Slots spaced at intervals on the fixture enable this one jig to handle a wide range of frame sizes. On this unit, a top grid also is employed and serves as a clamp to align and position parts during welding. Entire fixture is mounted on trunnions to permit tilting so welds can be positioned for downhand welding.

Various portions of the switch carrying the short arch-beam rail sections over which the crane and hoist units operate are assembled on fixtures shown in Figs. 6 and 7. Since it is desired to do as much welding as possible in a downhand position, different jigs are used for welding various joints of the same assembly. Fig. 6 shows welds being made on the upper plate of a switch. Here triangular pieces are welded into place to reinforce the rail which in this instance has a web made from plate. Fixture employs special clamps and is provided with adjustments so it can accommodate a wide range in sizes. Base of this unit is triangular in shape so operator can get close to the work without leaning over or assuming a tiring position.

Switch now is removed and clamped in fixture, Fig. 7, which clamps it in a position just the reverse of that in fixture Fig. 6 to permit downhand welding on remainder of switch. Note jig, Fig. 7, is hung from an arm supported on a vertical beam near the wall. This leaves all the space below the fixture free for addition of other members



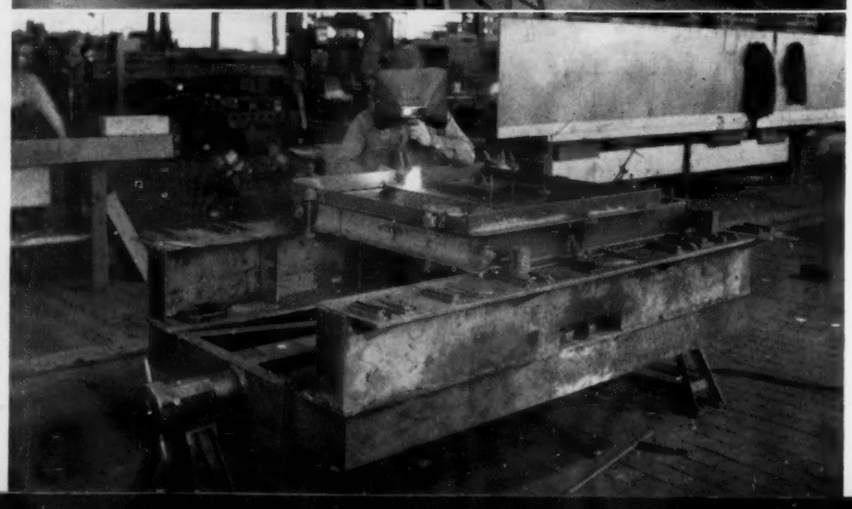


Fig. 4. (Top)—Fabricating department where rails are cut and drilled for fittings

Fig. 5. (Below)—Fixture where switch frames begin to take form

ADVERTISING PAGES REMOVED

to the switch assembly without interference from jig supports.

Fig. 8 shows a rather interesting setup employed in assemblying various switches. It makes use of a series of vertical supporting members each pair of which are permanently tied together near the floor by a cross beam. Each pair is free to move in slots in the floor. When correctly positioned for a job, bolts tighten the vertical supports solidly to the floor. Such an arrangement permits accommodating an infinite number of switch assembly sizes since the supports can be moved exactly where needed. It is here that final assembly of the switch takes place. Also operating chains and toggles are installed and operation of the completed unit checked.

In addition to the jigs and fixtures described and illustrated, about 30 others are used for various assemblies.

Materials handling has been accorded considerable study in this plant as fabrication of tramrail equipment not only involves many items but many parts are too large to be moved about by hand. I-beams from outside storage come into the building through the arch rail stamping press in Fig. 3 on roller conveyors. Other portable roller conveyors aid in stacking, storing and fabricating operations.

A one-legged gantry type crane serves the arch-beam rail welding machine and is shown in Fig. 2. Hoist of this unit rides on a rail section which interlocks into other sections permitting transverse movement of loads when desired. Tramrail saws and shears are served by jib cranes pivoted on nearby columns. Other equipment such as drills and machine tools also have individual jib cranes.

The area in which jigs and fixtures shown in Figs. 5, 6 and 7 are used also has a one-legged gantry crane carrying a tramrail section in-

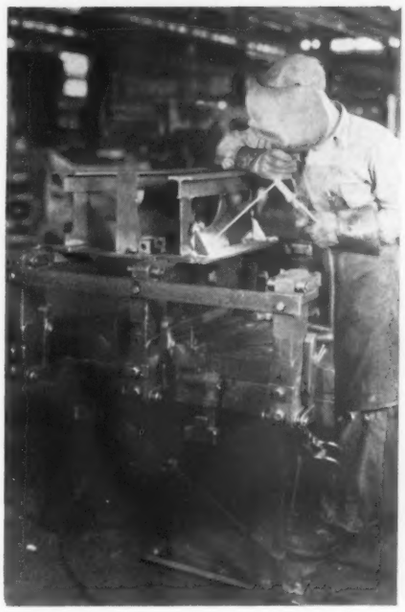


Fig. 6—Fixture used in building up switches

terlocking into adjacent sections. Other areas are served by a complete system of rails, switches, cranes and interlocking tramrail transfer bridges, some of which can be seen in the background of Fig. 8. Thus materials handling is adequately mechanized for maximum efficiency.

In making up a tramrail system for a particular installation, all switches and many other units may of course be standard. However, many installations require equipment not made up standard so some portion of it is assembled from standard units or built up to fit dimensions and conditions required by the particular layout.

Fig. 7. (Left)—Up-side-down or hanging fixture for completing work started in Fig. 6. Fig. 8. (Right)—Special layout for assembling switch parts

Steel Forging Treated In Compact Volume

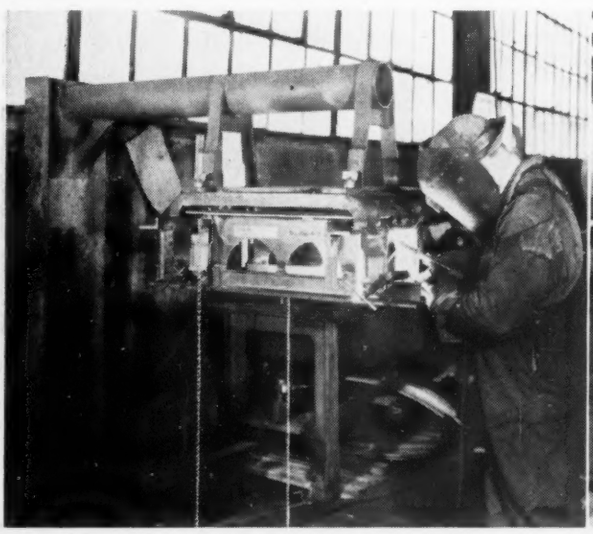
■ *Forging Practice*, by Carl G. Johnson; cloth, 136 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $1.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

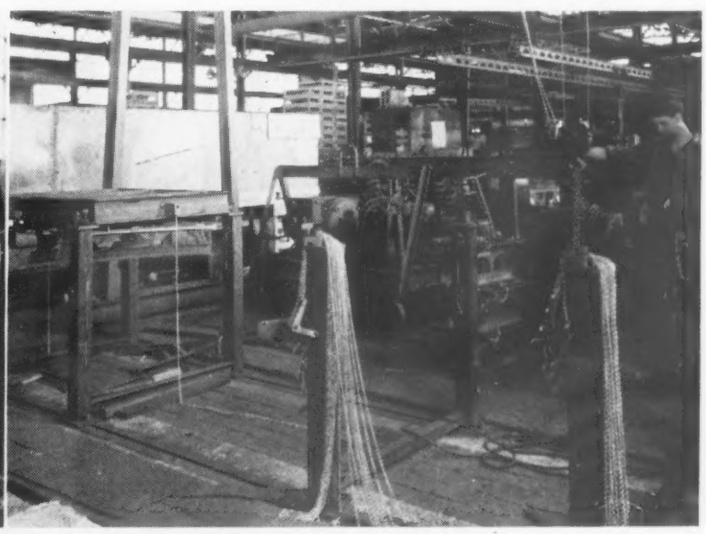
This is a practical treatise on hand forging of wrought iron, machine steel and tool steel; drop forging and heat treatment of steel, including annealing, hardening and tempering.

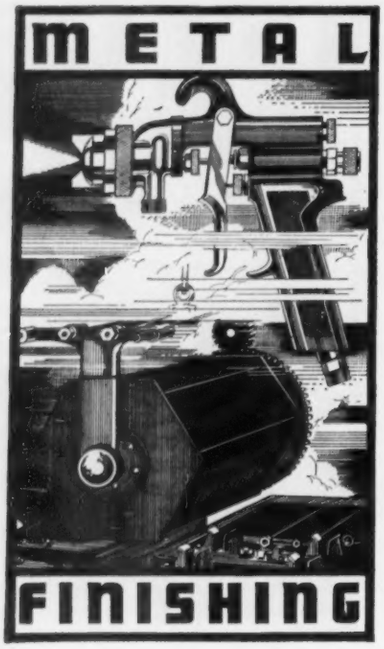
In the last few years, the author states, adoption of many new types of steel, particularly of the new high-speed and self-hardening variety, has made extensive demands on the machinist's knowledge of heat treatment of these metals. In fact, the importance of heat treatment is often lost sight of in the business of selecting a certain type of steel for a given class of work. Composition of the steel and the processes of forging, annealing, hardening and tempering the stock are of vital importance in producing a finished article which will endure, and it therefore behooves every metal worker to look carefully to the acquirement of the information necessary to handle this kind of work.

The volume contains many illustrations and diagrams to make the text clear and an index to aid in finding definite sections.

The author is assistant professor of mechanical engineering at Worcester Polytechnic institute and consultant and member of American Society for Metals and American Welding society. In addition to many years of practical experience he has spent years as an instructor.







High Speed Galvanizing

Successful operation and maximum output of high speed, continuous galvanizing equipment is largely dependent upon incorporating correct design factors in the furnace itself

■ ONE OF the more recent developments in the sheet steel industry has been the application of high speed machinery for continuous galvanizing. These machines, operating at speeds ranging from 25 to 100 feet per minute, are capable of handling sheets ranging all the way from 14 gage to 34-gage in thickness with a minimum amount of fatigue to workmen.

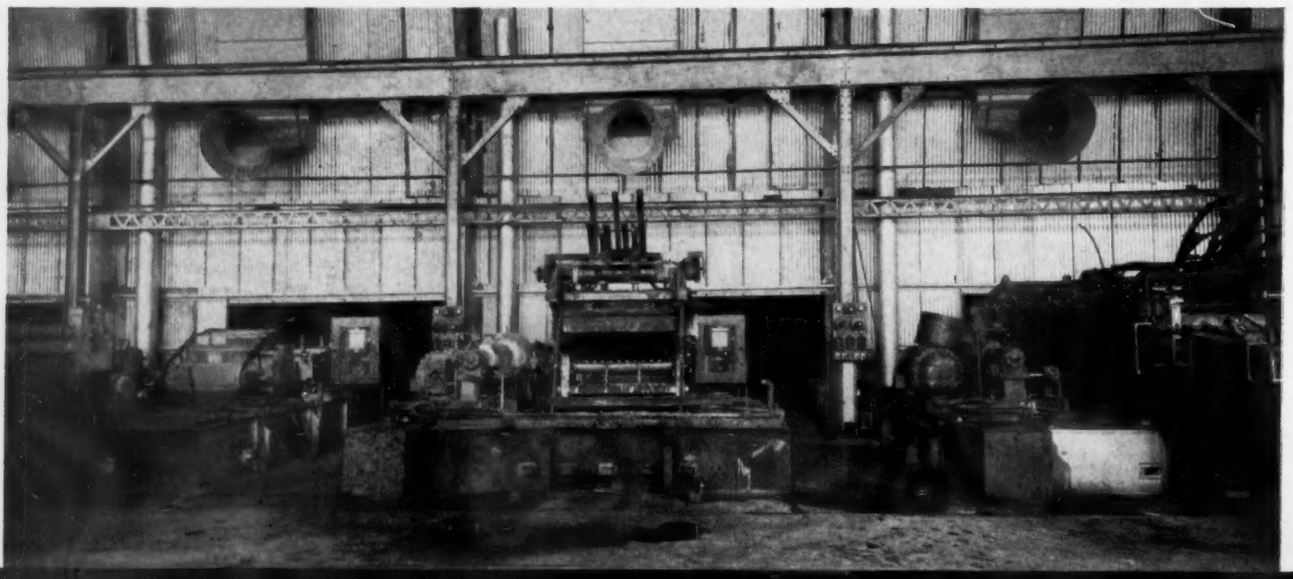
After the sheet is started into the train, it progressively passes through an acid dip and to the galvanizing bath. Magnetic rolls pull the sheet down on a mesh belt conveyor as it leaves the galvanizing bath. Conveyor then carries the sheet past a series of air jets which rapidly cool it. Next, the sheet passes through a water dip, the temperature of the water being automatically controlled at about 180 degrees Fahr. Following this, the sheet passes high pressure air jets which drive all moisture from its surface. After going through a roller leveler, it receives final inspection.

To keep up with the high speed possible by use of handling machinery, special attention must be paid to the galvanizing furnace itself. Although this may seem to be self-evident, nevertheless design of the furnace has received little attention except in a few recent installations. Fig. 1 shows a battery of sheet galvanizing furnaces with the hoods removed and one of the galvanizing machines lifted out of the kettle. Fig. 2 is a close-up of the furnace with the machine lifted out.

A galvanizing setting patented by Pennsylvania Industrial Engineers Inc., Pittsburgh, is widely used on such installations. Utilizing the "impact" method of firing, a homogeneous mixture of gas and air is directed at an angle into the interstices of a refractory bed formed of lumps loosely piled in the combustion chamber. Very rapid and complete combustion takes place due to the catalytic action of the incandescent refractory. Hot products of combustion then pass over a bridge wall, where they come in contact first with the upper portion of the kettle. Then they go down through the passage formed by the bridge wall and the side of the kettle, giving up heat to the kettle side walls until they pass to the flue along the bottom sides of the setting.

This method of firing permits transfer of heat to the kettle by means of radiation, conduction and convection: Radiation to the kettle walls from the hot combustion chamber and bridge wall; conduction from the hot gases to the kettle surface; and convection from the rapidly moving gases to the kettle as they pass on their way to the

Fig. 1—Typical installation showing battery of high speed galvanizing furnaces



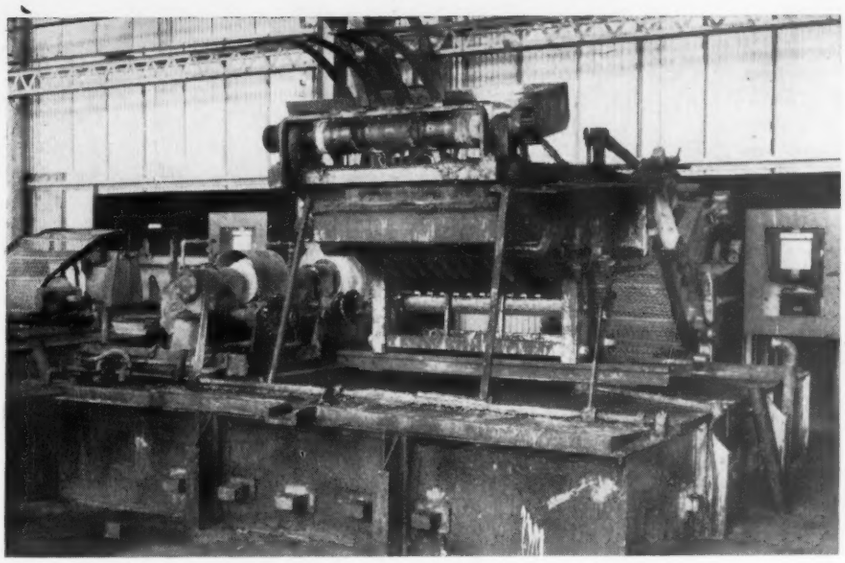


Fig. 2—Closeup of one of the galvanizing machines lifted out of the pot

stack flue. By taking advantage of all these methods of heat transfer, maximum efficiency is secured and hence the operating economy is good.

Other advantages found in this method of firing are that most of the heat is applied at the top where it is needed most since this is where radiation losses from the bath are concentrated and since cold work enters at the top. Burners are consequently relatively high up on the sides of the setting where danger of their fouling, in case of a break in the kettle, is minimized. The bottom of the kettle is shielded from contact with the hot gases to provide a place where dross may settle and be undisturbed.

Burners are distributed around three sides of the kettle at close intervals to provide even application of heat free from hot spots. The maximum fuel input is applied to the end of the kettle where the sheets enter. It is here that the maximum heat demand exists since cold sheets all enter at this point. No burners are used on the exit end since sheets carry the heat from the entrance to the exit end in their progress through the bath.

Fuel Control Automatic

Because of the wide variations in fuel demand which exist on a modern sheet galvanizing unit, running all the way from idle where it is only necessary to maintain the metal molten to the high demand found when galvanizing the heavier thicknesses of sheets, it is necessary to manifold the burners into two or more supply lines. Rate of gas flow to these several manifolds has been controlled automatically through proportional valves so arranged that the fuel input is exactly proportioned to meet the demands of the kettle for heat. Response of the valves is rapid enough to take care of all ordinary demands which may be put on the equipment. Burners and control valves are located in a tunnel under the floor level.

In addition to the temperature control, safety valves have been provided so in event of power failure during a week-end shut-down which could cause the control instrument to cease functioning, gas automatically will be shut off except for a small pilot flame large enough to keep a few burners in the setting lit and to maintain the metal in a molten state.

Kettle Size Proportioned

Of prime importance in any galvanizing operation but doubly important in sheet galvanizing is to have the kettle size proportioned so heat receiving surfaces are great enough. By this, it is meant that the kettle should be large enough to permit the maximum production rate desired with a conservative heat transfer rate through the kettle walls. By adhering to certain established rules of heat transfer rate, the effective life of the kettle can be greatly increased. At the same time, the rate of dross formation is reduced with a consequent further lowering of operating costs.

Where batteries of sheet galvanizing furnaces are used, it has been found helpful to install auxiliary furnace equipment consisting of at least one hot metal holding furnace and one lead pot for preheating the rolls for the galvanizing machine. The hot metal holding furnace is used to maintain metal molten during periods when it becomes necessary to repair one of the operating units and eliminates the necessity for pigging the metal in case of leakage.

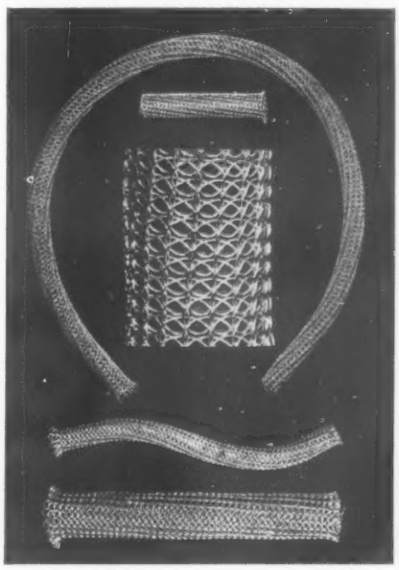
The lead pot is used to heat rolls before they are put into the outlet of the galvanizing machine. This is better than heating with a torch since the rolls are uniform in temperature and there is less tendency to warp them. It also prevents chilling the spelter at the outlet of the furnace where no burners are located and helps to reduce the delay entailed when starting up the furnace.

Knit Wire Tube With One Strand

■ MADE of rows of resilient loops, interlocked with other rows to form a continuous seamless tube, a new product known as Knitted Wire has been developed by E. H. Titchener & Co., Binghamton, N. Y. Wire of various gages can be used to produce tubing of many diameters and lengths. Formation of a tube is accomplished with a single strand of wire.

One combination of wire gage, mesh size and diameter will produce a tube of great flexibility, while another combination will make tubing with marked rigidity. Whether rigid or flexible, product is said to have high tensile, compression and torsional strength.

Knitted wire can be plated, rustproofed, enameled or coated. It is aimed for such industrial applications as armor for light electrical cords and as a covering for moving machine parts, for flexible shafts or drive belts. It may be used with bright chromium finishes in the decorative and display fields.



A single strand of wire is knitted to form this continuous, seamless tubing. Almost any combination of size and flexibility is possible

Program For America's Progress

(*Concluded from Page 34*)

duction of new and labor saving machinery; management and labor should co-operate in every practicable way to provide continuity of employment, and should study the annual wages of employes in relation to their hourly earnings and the number of days per year the plant operates, including careful consideration of the effect of hourly rates upon continuity of employment and income.

For sustained recovery, the platform declared, investment of savings in private enterprise must be increased greatly. The securities act of 1933 and the securities exchange act of 1934 include provisions that are unnecessarily severe. Also, cost and time-consuming requirements for compliance are greater than necessary for protection of investors. These laws have had a substantial effect in holding down to the present subnormal level the aggregate volume of new corporate securities issued and offered for sale. They bear down with social weight upon small and marginal enterprises which are important in the American economy.

Investments Discouraged

Job-making capital investments, the platform declared, have also been discouraged in recent years by government policies which create fear of inflation. Such fear would be dispelled by: 1—Definite and dependable currency standards which permit industry to plan ahead; 2—public debt levels not so high as to constitute a threat to currency stability, impose undue burdens on the taxpayer, or pile up excessive obligations for future generations to pay; 3—immediate, genuine and determined steps toward a complete balancing of the national budget.

Schemes to create purchasing power by artificial re-distribution of wealth do not increase production and do not bring increased employment. They drive capital into hiding, destroy the spirit of enterprise and reduce the volume of employment. The lesson of history is that purchasing power of the population is determined by the total volume of production and distribution of goods and services.

Also, sound prosperity for farm and factory can exist only when equitable price relationships bring about maximum exchange of their goods and services.

Regulation of certain aspects of private enterprise was recognized as an essential function of government, for the public good; but it was held that government should not either operate or directly control the facilities of private enterprise; regulation and control are inherently different.

"Regulation," said the platform, "functions from the outside, fixes in advance the rules of conduct and should deal impartially with all. Control penetrates into the interior and becomes a part of managerial authority. When government control enters the effectiveness of private management is impaired if not destroyed.

Limits of Regulation

"Regulation of manufacturing enterprise should be confined to insuring freedom and fair and open competition, together with protection of the rights of others, whether competitors, employes, employers, consumers or the public. Wherever regulation of manufacturing enterprise is imposed by government it should be embodied in specific statutes and administered insofar as possible by established executive departments of government. Any necessary special agencies should be given a minimum of administration latitude and should be required to exercise such administrative discretion by the issuance and advance publication of specific regulations, with opportunity for public hearings.

"Regulations issued by such special agencies and the administrative rulings of both executive departments and special agencies should be subject to adequate judicial review of the law and the facts by the established judicial departments of the government. Government should not attempt by compulsion or inducement to control the kind or quantity of goods and services to be produced and distributed to the people, beyond measures required to insure, fair, free and open competition and to protect the public health. Any such control will lead inevitably to the destruction of private enterprise and the rise of some form of state controlled enterprise."

Industry values accurate accounting and believes the same standards should be pursued by government in preparing its own financial reports so that citizens will be better able to understand the operation of government. Also, continues the platform, it is important that government, as is the case with industry, improve the efficiency of its service and reduce its cost to the public.

The government should stay out of business; the platform held that continuing and increasing government competition with private enterprise is a major deterrent to the flow of job-creating capital into business.

The platform held that foreign trade is not so important to the United States as to some other countries; our foreign trade should be encouraged by every legitimate means but should be related to the home economy, with the purpose of maintaining our standard of living.

The platform set forth an interesting view of national defense.

"Any apparent profit due to war," it held, "is more than wiped out by resulting depressions and overwhelming debt loads. Industry likewise opposes war because wars have tended to destroy representative government and protection of individual and minority rights—Because of the costs involved strict economy should be practiced in making necessary armament expenditures—activity resulting from armament expenditures," the platform held, "can only be temporary, creates artificial prosperity and is thus less desirable from every viewpoint than prosperity arising out of goods which improve living standards."

The document abstracted above reveals that industrial leaders today are thinking far beyond their immediate jobs. They are concerned with the welfare of the country. They know full well that industry's problems will be minimized as those confronting the country as a whole reach solution.

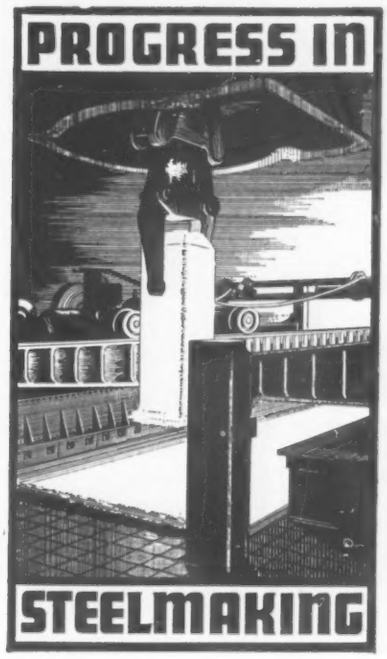
This platform is not based on snap judgment. It sets forth conclusions based on studies by several hundred business and industrial leaders over many months. It is a sound document and should be studied carefully by employers all over the country. It should help them in putting their own houses in order. It also should enable them to participate more effectively in the vast educational program that still is necessary before the people of this country will understand fully how they can achieve greater security and happiness.

♦

Develop New Alloy for Use in Magnetic Control

■ Use of magnets for operating a wide range of electrical switches and controls is made possible by development of a new alloy at Battelle Memorial institute, Columbus, O. By varying the proportion of iron, nickel, chromium and silicon in this metal, magnets can be made to respond to any desired temperature from 150 degrees below zero Fahr. to 1100 degrees above. This new alloy is unique in its wide range, and is said to be the first that is easy to machine and forge.

Besides protecting machinery from overheating, magnets made of this alloy can be used to turn on a fan at 90 degrees, to start a sprinkler or sound a fire alarm, control refrigeration and air conditioning.



Mill Instruments

Improved temperature indicating instruments for rolling mills make possible processes involving automatic control of mill speeds, mill drafts, furnace soaking zone temperatures

By J. L. WHITTEN
Lee Wilson Engineering Co.
Cleveland

■ FUNDAMENTALLY, rolling mill control should start with the soaking pit, go through blooming mill, slabbing mill and to strip, sheet, rod, rail or whatever the rolling process and finally through finishing processes. Application of temperature measuring equipment to rolling or forming processes is one of the newer features which largely determine ultimate quality of the product.

Early attempts to measure temperature of steel moving through rolling processes gave readings entirely too slow to be of practical service. Use of the photo-electric cell and electronics has speeded operation until now radiation pyrometer equipment can give a full scale reading on the chart in not more than 0.60-second. With speed like this, every variation in temperature along entire length of bar, billet or slab can be noted as it traverses various mill passes.

Records Strip Temperature

Even in continuous strip rolling, temperature can be obtained from end to end of the slab as it passes the turntable. By actual count, time for this operation has not been over one second, and yet a fast-moving chart has indicated the differences in temperatures between slab ends. These readings were supported later by readings after slab had been elongated which indicated this temperature difference was maintained throughout entire rolling process.

On continuous strip mills, a multiplicity of rolling stands requires more equipment per installation. Also more operations can be governed by such equipment. Here slab temperature must be taken immediately after it is free from scale, that is, after number one scale breaker. This is the temperature that enables the furnace operator to reset his furnaces if there are temperature differences in slabs from various furnaces. Three furnaces may have identical temperature control settings but may be producing slabs at widely different temperatures. Control at this point is essential for uniformity of rolled product.

Temperature reading after two roughing passes enables the operator to change his timing and drafting of the metal and determines the speed at which the next two roughing stands will be operated. After roughing rolling, temperature at holding table indicates time at which partially formed strip sheet will be sent to the finishing stands and also checks the two previous operations. After the first several slabs are rolled, assuming slab temperature is correct, the operator will be able to set roll speeds and drafts to bring material to the holding table at desired temperature so he can send the piece to the finishing rolls with little lost time in holding-table cooling.

The last check on the rolling operation is the temperature between the last two roll stands or after the last pass. While it is most desirable to take the actual finished temperature of rolling (after the last pass), in some cases the finishing temperature has been too near the lower end of present instrument scaling. However, recent developments have lowered the minimum scaling possible, so this objection may no longer exist.

Temperature at holding table and after the last pass determines finishing mill speed and drafting. It is this final temperature that has such a formative effect on final metal structure and its requirements in annealing, normalizing and temper passing operations. Thus it is most important that mill speeds be set so with the desired temperature at the holding table the material will finish at the desired temperature when it leaves the rolls.

Temperature Taken at Coiler

Some mills have most advantageously employed a further and final check, particularly in the case of strip, by taking strip temperature at the coiler. This temperature is apt to be low and the metal quite black, but metallurgical departments by knowing this temperature have often been able to adjust subsequent treatment to produce first quality material which otherwise might have been seconds or scrap.

Of course, a great many processes do not require so many points of control; in fact, many require only one point of control. Number of control points depends upon each particular installation and the information operators feel necessary.

Merchant mills up to 14-inch size and used largely for production of rods and bars have been controlled quite successfully by taking the temperature after the finishing pass of the mill. Here the sighting gun usually is placed in a horizontal position and is adjusted to sight on a rather small target, the side of

Abstract from paper presented at Instruments conference, Carnegie Institute of Technology, Pittsburgh, October, 1938.

the piece, which in most cases is not thicker than 2 inches. A sighting shutter limits field of instrument. With this equipment it has been possible to adjust each furnace burner to produce uniform initial heating even on bars which roll 200 feet in length.

One point of measurement has been largely satisfactory on blooming operations with the sighting piece also placed horizontally looking through a hole cut in the side of the mill guides so as to be sure to get the temperature of the bloom after every other pass as it is progressively worked through the mill. While the side presented to the target has had some time to form scale, no installation has been made where temperatures are taken from top of mill down on the bloom due to difficulty in keeping the gun sighted on its target.

In lapweld pipe mills, equipment has been successfully worked out so the sighting target moves to follow the welding roll positions when the mill alternates between two positions. In this case, the sighting gun was mounted on a trunnion and accurately positioned by stops so mill movement pulled the gun into exact position to follow it. Rectangular orifice plates to limit the sighting field to the welding band on the pipe were used.

A number of installations have been made on rail mills using one point of temperature measurement after the final sizing roll. Here the temperature is useful not only for governing rolling, but controlling the temperature which must be reached before the rail is sawed to length.

Wire rod mills have taxed ingenuity of designing engineers because the targets in many cases were no larger in diameter than three-eighths of an inch. Here again limiting orifices have made possible successful control. For most rod mill installations, two sighting guns are used, one to take bar temperature immediately after second roughing pass and the other to take finished rod temperature after final finishing roll. Application of the equipment has been expanded to taking the temperature of the rods as they are reeled into coils.

In seamless tube mills temperature has been taken after the first piercing operation at which point the pierced tubes are practically scale free. Some mills have taken temperatures further along in the sizing and reheating operations.

Thought is being given to ultimate control of mill speeds and mill drafts from rolling temperatures, and the automatic resetting of heating furnace soaking zone temperatures from rolling temperatures. Patent applications have been made for such processes, and it is felt that this is the next logical step in controlling rolling operations from steel temperature.

♦

Coal, Coke Standards Issued by A.S.T.M.

■ *A.S.T.M. Standards on Coal and Coke,* paper, 150 pages; published by American Society for Testing Materials; supplied by STEEL, Cleveland, for $1.25; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

A new revised compilation has been issued after an interval of several years, containing all A.S.T.M. standardized methods of testing, specifications and definitions pertaining to coal and coke. The volume is sponsored by committee D-5 and includes some 28 standards, in addition to a proposed test for agglutination of coal.

Standard test procedures are given covering such subjects as sampling, fineness, grindability, drop shatter test, tumbler test, screen analysis, size designations and cubic foot weight.

Specifications cover gas and coking coals, foundry coke, classification of coals by rank and by grade and round-hole screens for testing.

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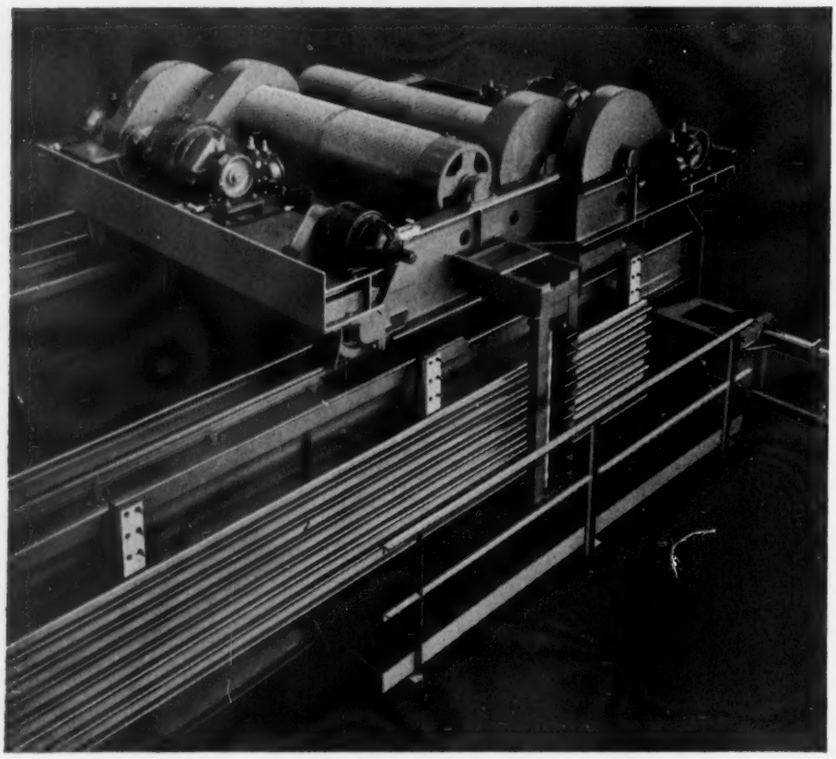

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Work Progression

(*Concluded from Page* 52)

tem has been found most satisfactory for cleaning heavy castings. All castings are thoroughly cleaned and painted before they are moved to pre-machining storage in main building.

Next in progression come the steel racks, handy to the spur track and to the main plant cutting-off department. Here are stored flats and rounds in all required grades.

The machine shop, or main plant, is also of double-bay structure, but has the large central section split by a row of steel columns. Large vertical turret lathe parts are started in the east section and proceed in that section until they are assembled in the final erecting department. West section is similarly used for Multi-Au-Matic and Contin-U-Matic pieces. In rare instances, parts are shuttled across to the opposite section and back again to avoid unnecessary duplication of machinery and equipment. The two side bays are used for the production of small parts.

Equipment Grouping Is Factor

Machines and equipment are arranged to incorporate the advantages of two methods of grouping; first, by operations to be performed and, second, by character of product. The two principal sections have the heavy-work departments arranged to suit the products. The two main sections are served by seven 20-ton, overhead cranes, four of which are in the vertical turret lathe section and three on the other side. These are supplemented by jib and column cranes along with electric lift trucks.

Machinery for fabrication of small parts is arranged in departments to provide maximum operating time for each machine and to secure specialized supervision. In general, large lots are passed through the various departments to take advantage of quantity production. Since each group of pieces has an individual route and requires different operations, continuous flow is impossible. However, the department layout has been planned so work has a general direction of flow for the majority of parts.

The tool room handles all specialty jobs including tools, jigs, and fixtures. This arrangement is ideal for production of small lot or single piece jobs which otherwise would restrict the flow of work in the main plant. Tool room is divided into two sections. The fabricating section carries work to the point where heat treatment is necessary. After work returns from heat treating, final grinding and assembling is carried out. Heat treatment and forge shop building also is used for cleaning of steel parts, torch cutting, welding and flame-hardening of gears and other parts.

A study of the progression of a 36-inch, vertical, turret lathe bed will indicate the flow of raw materials to the finished machine and the systetm of control. Fig. 3 shows the master route card for this part. Since the foundry is operated as a distinct division which sells castings to the main plant, the route card merely lists the general operations and carries on upon completion of foundry functions. Fig. 1 shows movement through the various departments for this type of lathe bed.

In the demonstration department, which immediately follows testing, tools are fitted to the machine for the specific job designated by the customer. Machine now is tried out on parts scheduled for production in the customer's plant to assure performance in exactly the manner specified. After acceptance by customer, machine is painted and boxed for shipment. Loading platform is at floor level so machines may be skidded directly into cars without lowering or raising.

Production of Bullard Mult-Au-Matic and Contin-U-Matic multiple spindle lathes is conducted in a similar manner with the exception that these machines move down the west bay.

Both large and small parts are handled by the master route card. Routes for small parts are obviously complex. However, since the movement of small parts is in tote boxes on electric trucks and the minimum length of travel is not essential, the advantages of arrangement by departments is evident.

While this company has worked out an efficient system for production and handling of its products, the management is constantly on the lookout for improvements. Standards are immediately altered to take advantage of better methods when presented and shown of value. With this plant layout, rate of flow of work in The Bullard Co. may be multiplied to meet tremendous peak production loads, and yet in dull periods it may be reduced greatly without lowering efficiency.

Strip-Mill Lubrication

(*Concluded from Page* 46)

accomplished by an oil hydraulic pump which develops the necessary static oil pressure to lift the roll sets just sufficiently to reduce the pressure of the necks on the bearings. All the while, the lubricating oil circulating system is operating. The possibility of bearing wear under such an arrangement is materially decreased.

Hydraulic power also is used in the shear control to maintain accuracy of cutting. Here the more typical oil hydraulic power transmission is used. In contrast with the accumulator, which is restricted to transmission of power in a straight line direction through reciprocating motion, the rotary type pump, with its accompanying rotary hydraulic motor, converts electric power as delivered by a constant speed electric motor operating in one direction, into hydraulic power of variable speed, capable of most accurate control.

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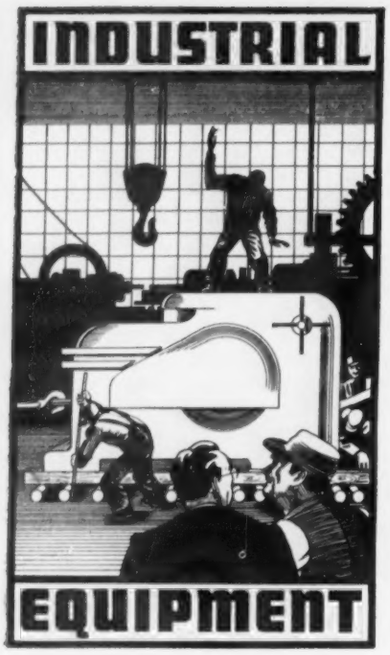


Introduces Machine For Lapping Centers

■ Ex-Cell-O Corp., 1202 Oakman boulevard, Detroit, has developed a center-lapping machine, designed to solve the problem of accurately centering parts which are to be ground between centers to close tolerance on the diameter for roundness.

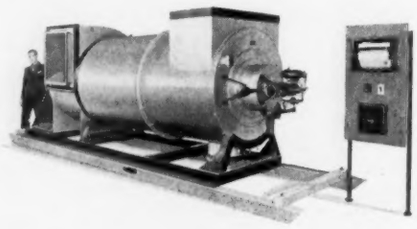
Machine consists essentially of a cast iron base and column, a motor-driven single spindle carrying the abrasive stone, an adjustable work rest and a dressing device. Unit will lap centers on work up to eight inches in diameter and up to 36 inches in length. One end of work is placed on a vertically adjustable center which can be rapidly positioned by means of a hand crank. Spindle then is lowered to permit stone to lap center in the other end.

Two 4-step pulleys provide variation in spindle speeds, spindle being driven by a V-belt. Spindle housing is mounted on balls in hardened and ground V-ways and is operated vertically by a hand lever. Entire assembly is counterweighted. Diamond dressor for lapping stone is mounted in a fixed 60-degree position on the column.

Oil-Fired Heaters Are Completely Automatic

■ Industrial Gas Engineering Co., 201 East Ohio street, Chicago, has introduced an automatic oil-fired recirculating convection type heater for application to existing drawing, annealing, stress relieving and other furnaces as well as to new heat treating equipment.

Designated as type LI, heater is offered in sizes ranging from 500,000 to 5,000,000 B.t.u. per hour, with air circulating capacities of 5000 to 60,000 cubic feet per minute. Heater comprises combustion unit with complete ignition, safety and temperature controls and circulating fan assembled on a common base. Combustion unit and fan have double-walled construction—heat resisting alloy inside and steel plate outside with insulation between. Flanged connections for ducts facilitate installation on top or beside the furnace or oven.



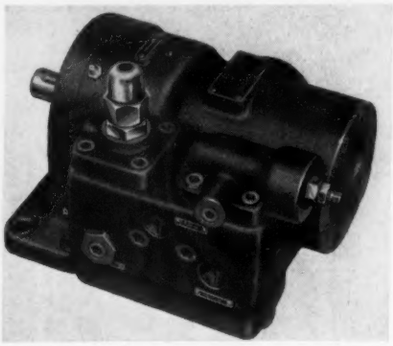
Fans are heavy duty, large volume type. Air cooled or water cooled shaft and bearing arrangements are available for operation at temperatures up to 1300 degrees Fahr. Automatic features of heater include automatic ignition, relighting as well as positive fuel shutoff in event of ignition failure. Oil burners and temperature controls are the proportioning type.

Similar units are available for gas fuel and for lower temperature operations, such as core baking, paint drying, etc.

Combination Pump Unit Provides Volume Control

■ Vickers Inc., 1400 Oakman boulevard, Detroit, has placed on the market a double pump and combination valve unit for operation in hydraulic control circuits. Maintaining structural simplicity of constant volume pumps, these units can automatically vary their output to handle either large or small volume requirements

In operation of these pumps, two balanced vane pumps are driven by a single shaft, output of one pump being available to the hydraulic working system under all circumstances and the other automatically cutting in only when needed. Thus, one pump may supply oil for feeding operations, and both pumps can supply oil for faster moving traverse operations.



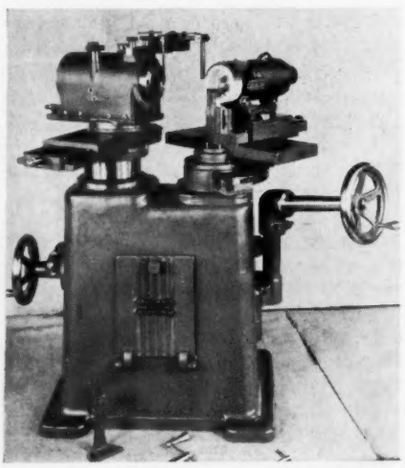
Unloading valve may be adjusted externally so that second pump delivery may be unloaded to tank at desired pressure. An integral relief valve also is included in the combination pump unit and functions to control maximum system pressure up to 1000 pounds per square inch.

A combination of two pumps may be selected to meet practically any traversing, feeding or clamping requirements.

Improvements Added To Face Mill Grinder

■ Oliver Instrument Co., Adrian, Mich., has brought out an improved No. 2 ARC face mill grinder, featuring several refinements not found in the previous model.

This machine has a heavier frame, which provides a more rigid support



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for work head and grinder head. Changes have been made in the work head and slides, making setup easier in change from right to lefthand cutters. A new type rigid lip rest is used.

Machine has a capacity for grinding face milling cutters from 6 to 26 inches in diameter, grinding face, corner and periphery at one stroke of the wheel. Different clearance angles may be had for face and periphery and any radius of corner from 0 to 2 inches. Channeling cutters may be ground in two operations, once set as a righthand cutter and once as a lefthand cutter. Smaller cutters, such as shell end mills, may be ground with a round corner at one setting by using an auxiliary spindle.

High Capacity Switch Is Manually Operated

■ I-T-E Circuit Breaker Co., Nineteenth and Hamilton streets, Philadelphia, recently completed the manually operated, 3-pole, 10,000-ampere

disconnect switch illustrated. It is so constructed that all three poles are opened or closed in unison, thus constituting, in effect, the opening or closing of a 30,000-ampere, single pole switch.

It is claimed this huge switch is hand-operated with greater ease than a conventional knife switch of one-fourth the amperage. A patented feature, known as "Klamp-Tite," enables high-capacity switches of this type to be operated manually.

Unique Chuck Design Lowers Drill Breakage

■ Scully-Jones & Co., 1901 South Rockwell street, Chicago, have placed on the market a unique, adjustable chuck, construction of which allows it to hold a drill within its body and feed it out by means of a screw arrangement. This permits operator of a machine to use only the amount of drill projecting that is necessary to go through the work and drill bushing.

This type of chuck can be adapted to drilling, counterboring and spotfacing to a given depth with the use of proper combinations. In multiple spindle machines all drills can be ad-

justed to project desired distance from the spindle. Breakage of drills is said to be eliminated because of the shorter grip used.

Tool Steel Welding Rod Repairs Damaged Dies

■ Welding Equipment & Supply Co., 2720 East Grand boulevard, Detroit, has developed a self-hardening, non-shrink tool steel welding rod for use in die and metal stamping plants.

It is used in repairing chipped or damaged dies without removing them from the presses, refacing punches and dies after they have been worn beyond use, facing cold trim drop forge dies, fabricating dies from cold rolled and machine steel, facing the cutting and drawing surfaces with welding wire and grinding to the desired size.

Weld can be forged and heat treated if desired. Plants using the new rod in die construction are not heat treating the weld and report that by use of the wire in mild steel construction they can manufacture dies for 50 to 75 per cent less cost than by other methods and with greater production.

Handy Tool Combines Knife and Screwdriver

■ Stanley Rule & Level Plant, Stanley Works, New Britain, Conn., has announced a new combination tool, a jackknife-screwdriver, designed for use by electricians and mechanics.

Screwdriver resembles a standard

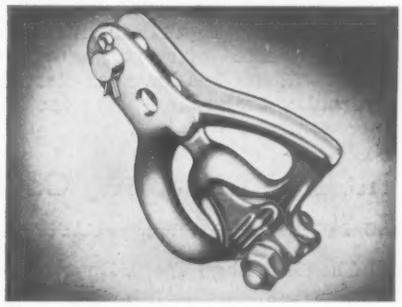
tip, 6-inch blade screwdriver, but in the handle there is a jack knife which opens easily.

Two styles are available. In one the jack knife is permanently locked in the natural color hardwood handle. In the other the jack knife is easily released from the metal sheath in the handle by pressing a button and is used as a separate tool.

Adds Strain Clamp for Medium Size Conductors

■ Ohio Brass Co., Mansfield, O., has brought out an intermediate universal strain clamp to accommodate the middle range of conductor sizes, from 3/16 to 7/16-inch. Clamp has a reversible keeper piece and will take any standard conductors from 8A to 2A Copperweld, from No. 4 to 3/0 solid copper, from No. 5 to 2/0 stranded copper, and from No. 6 to No. 2 A.C.S.R. Rated ultimate strength is 10,000 pounds.

Clamp weighs slightly more than 2 pounds and therefore causes no harmful conductor vibration. Though light and small, its body strength allows a liberal factor of



safety for any conductors. Most of the holding power is provided by snubbing action inherent in clamp's helical shape. A modified V-groove has a wedging action on the cable, increasing frictional grip between cable and clamp seat.

Carloader Turns in Boxcar Without Backing

■ Clark Tructractor Co., Battle Creek, Mich., has introduced a carloader, designed for loading and unloading freight cars and ships and for handling cargo in and out of stowage space.

Carloader has a 38-inch width, 38-inch wheelbase, 6-inch inside turning radius, 67-inch outside turning radius and will turn around in a boxcar without backing. It picks up load, lifts it, tilts it back 10 degrees for safe carrying, carries it at speeds ranging from 1 to 7 miles per hour, elevates it, tilts it forward 2 degrees for easy tiering. Unit is gasoline powered for continuous operation.

A special attachment is available for use in place of standard fingers. This is a removable steel tapered

lift plate attachment for use in handling materials not loaded on skids or pallets. Thin lip of the plate can be forced under load.

Low center of gravity, square tread and wheelbase give carloader maximum stability. Front-wheel drive and rear-wheel steer enable operator to enter boxcar and make a rightangle turn. Machine is made in straight models of 2000, 3000 and 3500-pound capacities, tiering to 60 inches, and three telescopic models of corresponding capacities that will tier loads in boxcars with 10 and 12-foot ceilings. Hydraulic mechanism is operated by an engine-driven pump. All models have self-starter, hydraulic brakes and automotive type controls.

Internal Measuring Gage Is Accurate and Sturdy

■ Sheffield Gage Corp., Dayton, O., has devised an internal measuring machine, designated as Model N-2, which provides an infinite range in measurement of internal diameters from ⅝-inch to 6 inches against a master or precision block setting.

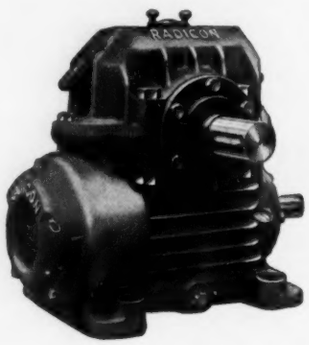
Machine is said to combine laboratory accuracy with sturdiness and ease of operation. Two fingers, each carrying a measuring point and both adjacent to a vertically traveling work rest plate, are designed to permit full exploration and determination of the dimensions of a hole at any point on its internal surface within the 1½-inch depth range of the gage.

Each of the gaging elements is mounted on vertical reeds; thus no loss of accuracy through friction is possible. Only a variation between the two gaging elements will vary the visual gage reading. There is always gaging pressure only on both sides of the hole being checked, irrespective of the operators' touch on the part being measured.

Worm Reducer Features Higher Load Capacity

■ Thomas Prosser & Son, 120 Wall street, New York, have announced their appointment as distributors for the United States of the Radicon worm reducer, which was developed by David Brown & Sons, Huddersfield, England.

Safe rating of this reducer has been so increased that a 30 per cent

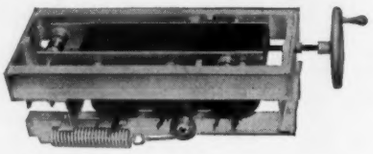


reduction in size has been possible for any given duty. Its 50 per cent reduction in oil drag gives increased efficiency and lower running cost. Automatic oil circulation eliminates need for maintenance. All bearings are positively lubricated by a continuous oil circulating system which works in both directions of rotation.

Efficient cooling has been an important factor in increasing the load carrying capacity of this reducer. All processes of heat transference are employed: Radiation — by increase in surface area; convection— from upper housing resulting from vertical ribbing; and conduction — by fan projecting a stream of cold, high velocity air along horizontal channels. It is claimed that such cooling, together with the patented shape gear tooth, has increased load carrying capacity up to 100 per cent.

Custom Built Reactors Provide Voltage Control

■ Raytheon Mfg. Co., Waltham, Mass., has developed a continuously variable polyphase reactor for general use in industry where it is necessary to have a smooth, continuous control of polyphase alternating current power. Reactor develops a drop of 300 volts at 50 amperes per coil.



By study of mechanical resonance and use of biasing springs, manufacturer has reduced vibration to a point where there is no objectionable noise. These units have been used to vary anode potential when exhausting large rectifier tubes having outputs up to 300 amperes.

Reactors are custom built to meet given voltage and power requirements.

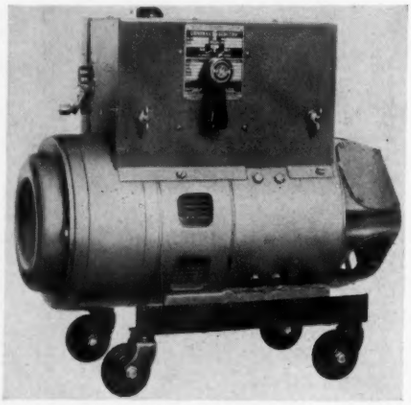
Arc Welding Equipment Has Overload Protection

■ General Electric Co., Schenectady, N. Y., has placed on the market a 150-ampere, direct current, single operator arc welding unit for light-gage work.

Because of its high, instantaneous recovery of voltage, this equipment is said to prevent arc pop-outs at all points in its welding range with any good bare, lightly coated or heavily coated electrode. Its stability prevents excessive current surges, thus avoiding excessive spatter loss and sticking of the electrode.

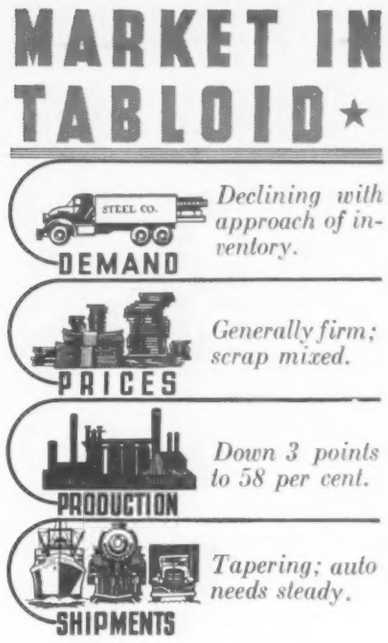
Any welding current within its range can be obtained by means of a three-point selector switch and a dial for intermediate adjustment. Isothermic overload protection permits equipment to carry maximum safe overloads without danger of burnouts and without unnecessary interruptions on harmless overloads.

Welder is rated 150 amperes at 25 volts, and its range of adjustments varies from 20 to 200 amperes at 25 volts.



Demand Continues To Recede Slowly

Season Cuts Output; Outlook For Next Quarter Better



■ SLOWNESS with which activity in steel markets is responding to dulling effects of the season is enhancing the first quarter outlook.

Good demand from the building and automotive industries largely is offsetting restricted shipments to smaller consumers who are attempting to reduce inventories. A somewhat unexpected, but encouraging, revival in purchasing by railroads not only is a factor in bolstering current sales, but also promises to develop into a more sustaining influence early next year.

Steelmaking receded 3 points last week to 58 per cent, a reduction of 5 points from the peak attained the week of Nov. 19. An indication that consumption has declined less than production the past several weeks is seen from the fact sales of steel products out of warehouse in most districts so far this month are at least equal to the volume of the corresponding November period. In a few instances business is heavier than a month ago.

Warehouse sales ordinarily tend downward in December, and while the holiday period will develop some slackening, the recent performance has a favorable implication for first quarter activity.

Railroad Equipment, Track Material Are More Active

High-lights of railroad markets are the placing of 25,000 tons of rails by the Chesapeake & Ohio and 3250 tons by the Pere Marquette; awarding of 1500 hopper cars by the Norfolk & Western and 40 sleeping cars by the Pullman Co.; inquiries of the Illinois Central for 1000 gondolas and the Chicago & North Western for two ten-car streamlined passenger trains; and proposal of the Pittsburgh & West Virginia to scrap a substantial portion of its equipment pursuant to early replacement. Chicago Great Western has ordered 4200 tons of rails and 2800 tons of fastenings.

Urgency to start work on various projects financed by PWA funds still is stimulating markets for structural shapes and reinforcing bars. Activity in the latter is reported in some districts to be the best for this month in many years.

A lull will follow closing on the numerous jobs now pending, but shipments of steel required will be spread over a number of months next year. However, there is some question whether the anticipated improvement in private building in 1939 will match the tonnage now emanating from public works.

With finished steel prices established for first quarter—generally at unchanged quotations—buyers are in no hurry to make forward commitments, while the inventory period is holding current receipts to actual necessities. Some pig iron producers have made no formal announcement regarding first quarter prices, but business is being accepted at present figures.

Automotive Needs Continue Leading Outlet For Steel

Automotive requirements continue the leading outlet for steel products. Motorcar assemblies last week touched a new high for the year at 102,905, against 100,705 the week before, and are expected to hold around this level for at least the remainder of December. Trend of retail demand the next few weeks will determine the extent of the seasonal letdown in production in January and February.

Steel production was unchanged or higher in most districts last week. However, reductions of 2 points to 41 per cent at Pittsburgh, 9 points to 56 per cent at Youngstown and 7.5 points to 59 per cent at Cleveland largely were responsible for a 3-point drop in the national rate. In addition, New England was down 10 points to 70 per cent and Buffalo was off 5 points to 44.

Detroit operations increased 3 points to 89, Birmingham was up 7 points to 82 and Chicago rose 0.5 to 60 per cent. Unchanged districts were eastern Pennsylvania at 37, Cincinnati at 75, Wheeling at 62 and St. Louis at 51.5. A further drop in production is indicated for the next two weeks.

Scrap is quiet and prices generally are easy, but higher quotations in eastern Pennsylvania, resulting from activity in export material, has raised the scrap composite 17 cents to $14.83 and the iron and steel composite 2 cents to $36.38. The finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Dec. 17	Dec. 10	Dec. 3	One Month Ago Nov., 1938	Three Months Ago Sept., 1938	One Year Ago Dec., 1937	Five Years Ago Dec., 1933
Iron and Steel	$36.38	$36.36	$36.36	$36.39	$36.48	$38.88	$31.01
Finished Steel	56.50	56.50	56.50	56.68	57.20	61.70	51.10
Steelworks Scrap..	14.83	14.66	14.75	14.58	14.23	13.24	10.12

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Dec. 17, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.55
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.65
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.10	$5.35	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, open-hearth, Youngs.	$34.00	$34.00	$34.00	$37.00
Sheet bars, open-hearth, Pitts.	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Dec. 17, 1938	Nov. 1938	Sept. 1938	Dec. 1937
Bessemer, del. Pittsburgh	$22.34	$22.34	$21.34	$25.26
Basic, Valley	20.50	20.50	19.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	21.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	21.21	25.21
No. 2 foundry, Chicago	21.00	21.00	20.00	24.00
Southern No. 2, Birmingham	17.38	17.38	16.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	19.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.125	22.215	26.215
Malleable, Valley	21.00	21.00	20.00	24.00
Malleable, Chicago	21.00	21.00	20.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	20.17	24.17
Ferromanganese, del. Pittsburgh	97.77	97.77	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.50	$15.15	$15.25	$13.40
Heavy melt. steel, No. 2, E. Pa.	13.50	12.75	12.75	13.13
Heavy melting steel, Chicago	13.75	14.20	13.60	12.40
Rails for rolling, Chicago	17.75	17.40	17.75	14.25
Railroad steel specialties, Chicago	16.00	16.10	16.60	15.75

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.30
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, Del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New Cork, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c

Iron

Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c

Reinforcing

New billet, straight lengths, quoted by distributors

Pittsburgh	2.05c
Chicago, Gary, Buffalo, Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c

Rail steel, straight lengths, quoted by distributors

Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45

(Per pound)

Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00

To Manufacturing Trade

Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)

Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c

Worcester, Mass., $2 higher on bright basic and spring wire.

Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

* Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem	2.80c
Detroit, delivered	2.90c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo.	0.55
4600 0.20 to 0.30 Mo. 1.50-2.00 Ni.	1.10
5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c
	Cleve.
Carbon	Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass., $4 higher.

Commodity Cold-Rolled	Strip
Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00

Cents per pound

Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chgo., B'ham.	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs.; 20 lbs. up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex. U.S.S.	S.A.E.
½ inch & less	65-5 70
⅝-1-inch	60-10 65
1⅛ and larger	60-5 60-5

Hexagon Cap Screws

Milled	50-10-5 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½

Iron

¾	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54

Iron

2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet, f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Clev., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 11/16-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.90c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$27.75

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.25
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birmingham	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.44	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	{ Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95

	No. 2 Fdry.	Malleable	Basic	Bessemer
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del. Chicago	28.34
		Lyles, Tenn.	23.50

Silvery†

Jackson count, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base: Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead-burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickset magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$23.50-24.00
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $92.50
Do., del. Pittsburgh 97.77

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00
Do., New Orleans 28.00
Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50
Do., ton lot 80.50
Do., 75 per cent 126.00
Spot, $5 a ton higher.

Silicoman, 2½ carbon 97.75
2% carbon 102.75 1% 112.75
Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.60-1.65

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb. del. carlots 10.50c
Do., ton lots 11.25c
Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c
Do., ton lots 17.25c
Do., less-ton lots 17.50c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40%, lb. con. ti., ton lots $1.23
Do., less-ton lots 1.25
20-25% carbon, 0.10 max., ton lots, lb. 1.35
Do, less-ton lots 1.40
Spot 5c higher

Ferrocolumbium, 50-55%, contract, lb. con. col., f.o.b. Niagara Falls $2.25
Do, less-ton lots 2.30
Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50
Do, spot 145.00
Do, contract, ton lots 145.00
Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50
Do, spot 160.00
Do, contract, ton lots 160.00
Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c
Spot ½c lb. higher

Chromium Briquets, contract carloads, freight allowed, lb. 7.25c
Do, spot carlots, bulk 7.50c
Do, ton lots 8.00c
Do, less-ton lots 8.50c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05
Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10
Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c
Do, spot 85.00c
88% chrome, contract 79.00c
Do, spot 84.00c

Silicon Metal, 1% iron, contract, lb. 14.50c
Do, 2% 13.00c
Spot ¼c higher

Silicon Briquets, contract, carloads, freight allowed, ton $69.50
Carload, spot 74.50
Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, freight allowed lb. 4.75c
Ton lots 5.25c
Less-ton lots 5.50c
Spot ¼c higher

Zirconium Alloy, 12-15%, carloads, gross ton $97.50
Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c
Do, ton lots 15.00c
Do, less-ton lots 16.00c
Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60
Do, 100-200 lb. lots 2.75
Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.40
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.50
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.68	3.83	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.01	4.16	4.16	3.96	3.96	5.71	3.91	....	5.26
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	4.20	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	4.20	....	5.50
Portland, Oreg.	4.30	4.70	6.10	4.15	4.15	5.90	3.75	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	4.10	3.83	7.57	6.17	5.92	7.39	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.83	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.60	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Dec. 15

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Continental Channel or North Sea ports, gross tons: Quoted in dollars at current value	Continental Channel or North Sea ports, gross tons: **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$25.74 5 10 0	$17.04	2 0 0
Basic bessemer	....	16.40	1 18 6
Hematite, Phos. .03-.05	30.42 6 10 0*	.....	.....
Billets	$36.86 7 17 6	$42.60	5 0 0
Wire rods, No. 5 gage	52.77 11 5 6	43.66	5 2 6
Standard rails	$47.39 10 2 6	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	2.00c to 2.05c	5 2 6 to 5 5 0
Structural shapes	2.22c 10 12 6	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.42c 11 11 3	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm.	2.72c 13 0 0	2.83c	7 5 0*
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.41c	8 15 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	3.87c 18 10 0	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.74 1 0 3	.....	.....

British ferromanganese $92.50 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$25.51	5 9 0(a)	$15.73	598	$16.85	500	$25.27	63
Basic bess. pig iron	23.40	5 0 0(a)	.....	...	.....	...	27.88	(b)69.50
Furnace coke	6.44	1 7 6	5.92	225	7.25	215	7.62	19
Billets	36.86	7 17 6	22.09	840	28.98	860	38.71	96.50
Standard rails	2.12c	10 2 6	1.38c	1,150	2.06c	1,375	2.38c	132
Merchant bars	2.56c	12 4 0††	1.30c	1,080	1.65c	1,100	1.98c	110
Structural shapes	2.30c	11 0 6††	1.27c	1,055	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm	2.45c	11 14 3††	1.62c	1,350	2.06c	1,375	2.29c	127
Sheets, black	3.29c	15 15 0§	1.92c	1,600‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.87c	18 10 0	2.70c	2,250	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.71c	12 19 0††	1.45c	1,210	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

—The Market Week—

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1.	†12.00
Bos. dock No. 1 exp.	13.50-13.75
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	11.75-12.25
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers.	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.50
Eastern Pa., No. 2	13.50
Federal, Ill.	12.00-12.50
Granite City, R. R.	12.75-13.25
Granite City, No. 2	12.00-12.50
Los Angeles, No. 1	13.50-14.00
Los Angeles, No. 2	12.50-13.00
N. Y. dock No. 1 exp.	11.50-12.00
Pitts., No. 1 (R.R.)	16.00-16.50
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.50-15.00
St. Louis, R. R.	13.00-13.50
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	12.00-13.00
Toronto, dirs. No. 1	10.00-11.00
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	11.75-12.25
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.00-13.50
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	11.00-11.50
Valleys	14.00-14.50

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.50-15.00
St. Louis	8.00- 8.50
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers.	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.50- 8.00

BUSHELING

Buffalo, No. 1	11.75-12.25
Chicago, No. 1	12.50-13.00
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new.	10.00-10.50
Valleys, new, No. 1	13.50-14.00
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	7.00- 7.50
Cincinnati, dealers.	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 4.75
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	4.00- 4.50
Toronto, dealers	4.25- 4.75
Valleys	8.50- 9.00

SHOVELING TURNINGS

Buffalo	8.50- 9.00
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.75- 7.25
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.25- 7.50
Cincinnati, dealers.	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	3.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.00- 9.50
Toronto	5.00

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	8.00- 8.50
Chicago	5.50- 6.00
Cincinnati, dealers.	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.75-16.25

ANGLE BARS—STEEL

Chicago	15.50-16.00
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	17.00-17.50
Chicago, leaf	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	16.75-17.25
St. Louis	15.50-16.00

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.75-17.25
Cincinnati, dealers.	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	16.75-17.25
St. Louis, 2 ft. & less	15.25-15.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	16.25-16.75
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.00-14.50

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.50-10.00
Cincinnati, dealers.	7.25- 7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	9.00- 9.50
Cincinnati, dealers.	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.75-13.25
Toronto, No. 1 dlr.	10.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	11.75-12.25
Cleveland	11.50-12.00
Detroit	9.50-10.00
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.50-19.00

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.00-17.50
Pittsburgh	17.25-17.75
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.50-18.00
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	17.50-18.00

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00
Chicago, net	19.00-19.50
Eastern Pa.	21.50-22.50
St. Louis	19.00-19.50

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†14.75-15.00
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.50-16.00
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	16.75-17.25
St. Louis, iron	14.00-14.50
St. Louis, steel	15.50-16.00

NO. 1 CAST SCRAP

Birmingham	†12.50-13.00
Boston, No. 1 mach.	†11.00-11.50
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50-15.00
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	10.00-12.00
St. Louis, cupola	12.50-13.00
St. L., agr. mach.	14.00-14.50
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	11.00-12.00

HEAVY CAST

Boston dist. break.	†10.75-11.00
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break. net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	16.00
Los Ang., auto, net.	13.00-13.50
New York, break.	†11.50-12.00
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers.	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50-14.00
New York, fdy.	†10.00-10.50
St. Louis	8.00- 8.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	16.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbess.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbess.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.00
Swedish low phos.	12.00
Spanish No. Africa basic, 50 to 60% nom.	nom.
Tungsten. sh. ton. unit, duty pd. nom.	$20.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices net including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	32.00
So. African, 50-52% nom.	32.00
Indian, 50-52%	Nominal

Sheets

Sheet Prices, Page 74

Pittsburgh—Sheet releases are fair, consisting mostly of automotive tonnage, but new business is receding with the approach of the year end. Orders generally are small and for prompt shipment, with prices firm. Despite seasonal influences, production is sustained at around 65 per cent for common and full finished material, the year's best level. Inquiries indicate a resumption of buying after Jan. 1. Only actual necessities are expected to be placed the next two weeks.

Cleveland—The usual seasonal decline in new business is less prominent than some sellers anticipated. Expectations after the first of the year are encouraging in view of the improvement in automotive outlook the last few weeks and the steady gain in operations among most miscellaneous consumers. Mills expect to have little difficulty clearing books of low-priced tonnage taken in October. Prices on all finishes are firm.

Chicago—Sheet bookings are light and spotty, coming principally from smaller users. Ordering is expected to resume in more general volume next quarter.

Boston—Sheet buying has sagged, new business being confined to small scattered orders for prompt delivery. While industrial consumption has declined, this appears to be partially seasonal, with a rebound likely soon after the first of the year. Jobber stocks of sheets are better balanced, but inventories are not large, indicating additional releases by distributors shortly. Building construction requirements will also be heavier.

New York—Sheet sellers generally wil have completed shipment of low-price tonnage by the end of December. Many consumers long since have absorbed tonnage bought at October concessions and have reordered at full prices. Consumption is off seasonally this month.

Philadelphia — Consumption concontinues to expand, especially in the automotive trade where two plants are running close to capacity and a third has just added a second shift. Miscellaneous stamping interests also are fairly active, including makers of small parts for refrigerators and radios.

Buffalo—Except for automotive demand, sheet buying is off moderately. Miscellaneous users are withholding purchases until after Jan. 1. Production is 50 to 60 per cent.

Cincinnati — Specifications are lighter, but backlogs are sustaining operations. New buying the past few weeks has been largely for prompt shipment and first quarter schedules are indefinite.

St. Louis—Sheet production remains active, despite the small volume of new business. Galvanized sheets are moving relatively well, stimulated by favorable weather, but enameling stock is less active. Better demand from railroads is in prospect for early 1939.

Birmingham, Ala.—In keeping with production for the past several months, sheets continue to be turned out at full capacity. Nothing is evident at the moment to indicate immediate recession in output of this product.

Strip

Strip Prices, Page 75

New York — Eastern cold strip mills will carry over for shipment after Jan. 1 some of the low-carbon tonnage booked at lower prices early this quarter. In some instances this is due to shipment of

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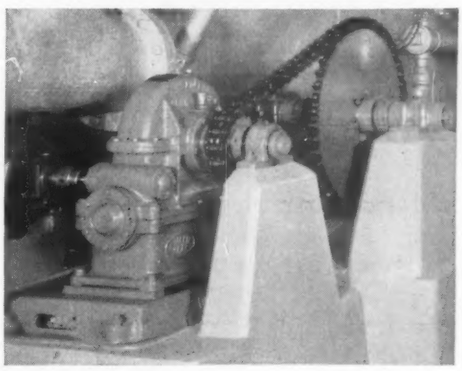

The modern drive above shows a Philadelphia double reduction Worm Unit operating water treating equipment. Note the heavy overhung load.

Every detail of manufacture has been carefully watched, beginning with the materials which are generally chill cast nickel bronze for the gear and a high alloy steel worm carefully carburized to give proper depth and hardness of case.

The ultimate in precision and accuracy is accomplished by the final machine grinding of the worm threads and accurate generation of the gear teeth. This positively insures correct tooth form and a smooth bearing surface.

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Philadelphia Gear Works
Industrial Gears and Speed Reducers
Erie Avenue and "G" Street
PHILADELPHIA

higher-priced stock, needed by consumers immediately, ahead of old volume, some of which will go into inventory. Demand has slackened, but early resumption of buying by the automobile trade is indicated. In some directions, notably among scattered accessory and partsmakers, this movement has already started. Demand for high-carbon material continues relatively brisk and prices on all grades and finishes are steady.

Boston—Automotive partsmakers have resumed buying of narrow cold strip as a result of depleted inventories. Slower demand from some industrial users, however, about balances gains in other directions, resulting in a slight decrease in total business. Forward buying is absent. While rerollers are operating practically full, some low-price tonnage booked in October will be carried over into next quarter.

Birmingham, Ala.—Strip production is irregular and light. Some little cotton tie production is being done for stock accumulations against future requirements.

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DAMASCUS STEEL CASTING CO.
New Brighton, Pa.
(Pittsburgh District)

Plates

Plate Prices, Page 74

Chicago — Railroad carbuilding programs are beginning to aid the plate market, but general industrial demand has tapered. Fabricators are occupied chiefly with public works projects, noting a letdown in activity in plate work for the petroleum industry. A pipe line for the Shoshone river project, Cody Wyo., will take 1200 tons.

Boston—Most steel plate inquiry and purchases is coming from specified public work, which apparently has reached its peak with several thousand tons active, large diameter steel pipe leading. Shipyard releases and requirements are mounting and contracts are being placed against 1915 tons, mostly plates, for Portsmouth, N. H., navy yard submarines, an equal amount being for Mare Island, Calif., bids Nov. 29.

New York—Export plate demand consists mostly of small tonnages of ship plates for Holland. Little business is coming from the Far East. Export prices are steady, but competition from other plate producing countries is taking business from domestic mills. Award recommendations are being made on 329 buoys for the lighthouse bureau, involving several hundred tons of plates.

Philadelphia — Plate production has been curtailed materially, reflecting smaller domestic and export business. Shipbuilders expect to start this month on the first of the C-3 vessels placed recently by the maritime commission, requiring distribution of several thousand tons of plates. The navy, which will take bids Feb. 15 on two 6000-ton cruisers, has awarded contracts for 3706 tons of plates, sheets and strip. Recipients were Worth Steel Co. 2720 tons, Thomas Gregory Galvanizing Works 666 tons, and Lukens Steel Co. 320 tons. Pennsylvania railroad is rumored to have an extensive carbuilding program ready for announcement early next year.

Bethlehem Steel Co. has been awarded three cargo-passenger ships by the maritime commission on a bid of $3,218,000 each.

Birmingham, Ala.—Largely because of freight car business, some government jobs and a few scattered projects of smaller size, production of plate remains steady. Output is estimated at a little better than 60 per cent.

San Francisco—The metropolitan water district, Los Angeles, returned bids unopened on 2450 tons for a welded steel or precast reinforced concrete pipe line involving 400 tons of sheets and over 1400

tons of reinforcing material in the precast line. Awards totaled 200 tons and brought the aggregate to date to 45,157 tons, compared with 60,997 tons for the same period a year ago.

Seattle—Tacoma opened bids Dec. 15 for about 900 tons of 58-inch steel pipe, alternate lock joint concrete. Puget Sound Navy Yard has called bids Dec. 28 for furnishing a 400-pound gage pressure boiler for proposed heating plant, also oil burning equipment, preheater etc. Steel Tank & Pipe Co., Portland, is low for furnishing Eugene, Oreg., a 100,000-gallon water storage tank, requiring 50 tons of plates.

Plate Contracts Placed

2000 tons, medium steel plates, navy yards, Brooklyn and Philadelphia, battleships, North Carolina and Washington, to Central Iron & Steel Co., Harrisburg, 2.08c and 1.94c, respectively; bids Nov. 29, schedule 4969, bureau of supplies and accounts.

355 tons, Lincoln water storage tank, Pittsburgh, to Hunter Steel Co., Pittsburgh.

175 tons, 600,000-gallon water tank, Brunswick, Me., to Pittsburgh Des Moines Steel Co., Pittsburgh.

155 tons, two tanks, federal jail, Ashland, Ky., to Ingalls Iron Works, Birmingham.

100 tons, 400,000-gallon tank, pumping plant, naval base, San Diego, Calif., specification 8961, to unnamed interest.

Unstated, 150,000-gallon elevated water tank, Fitzsimmons general hospital, Denver, Colo., to Chicago Bridge & Iron Co., Chicago, $18,780; bids Dec. 6, to constructing quartermaster.

Plate Contracts Pending

2450 tons, 21 to 37-inch welded steel or precast reinforced concrete pipe line, metropolitan water district, Los Angeles; bids returned unopened and new bids will be taken soon.

800 tons, Shoshone river and Bucks Springs creek siphons, specification 814, near Cody, Wyo.; bids Dec. 20.

225 tons, two 500,000-gallon water tanks, Montpelier, Vt.

Bars

Bar Prices, Page 74

Cleveland—Commercial and alloy steel bar demand continues to ease seasonally, despite heavy requirements of automotive partsmakers. Farm equipment needs show little change, but some improvement is anticipated next quarter. Most consumers are concentrating on reducing inventories with the approach of the year-end tax period. Deliveries on most grades are a week to ten days.

Chicago — Bar demand is sustained, largely through automotive needs. Tractor and implement plant requirements are fair, although not in the volume that is expected for January. Government projects are helping the common iron bar market, business in this commodity showing small gains, with better buying by railroads in prospect.

Boston — Commercial steel bar buying is tapering, although the number of small orders for alloy grades is encouraging. For chainmaking and miscellaneous government shop requirements, inquiries are maintained. Releases to the airplane parts trade are steady. Forging shop inventories are low as a rule, with improvement in demand from these expected shortly. Shipbuilding continues to absorb a good volume, but most buyers are marking time until after the first of the year.

New York—Bar sellers look for little activity until after Jan. 1. Most jobbers and consumers are releasing only small lots, although automotive and airplane interests still are covering briskly on carbon, alloy and cold-drawn grades.

Philadelphia—Merchant bars are quieter, largely reflecting the dispo-

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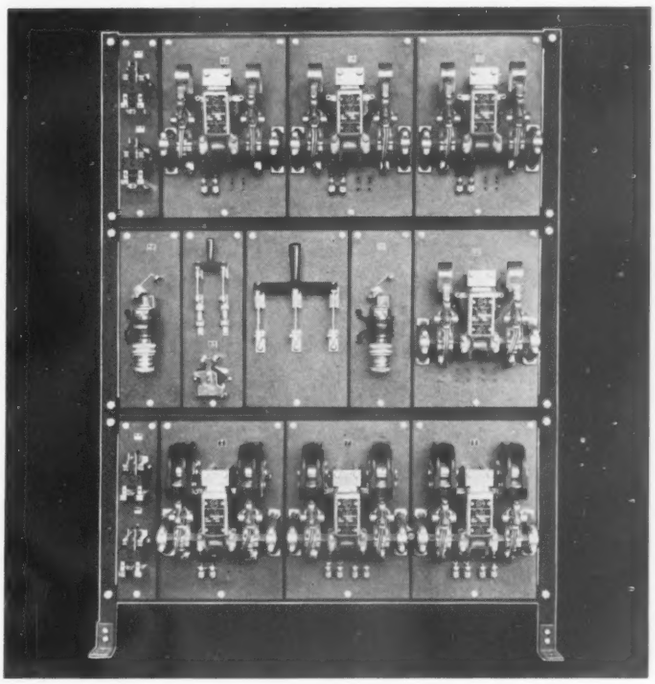

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sition of warehouses to hold down year-end inventories. Bolt and nut makers are slow buyers but are encouraged over firmer prices. Railroad buying is confined to a few small lots. Machine tool builders are fairly active on foreign business and expect a pickup in domestic buying next quarter.

Buffalo—Aided principally by automotive needs, bar demand is supported sufficiently to hold rolling schedules near previous levels.

Birmingham, Ala.—Continuing at about 60 per cent or slightly better, bar output has shown little change during the past week. Some scattered business from manufacturers of agricultural implements is evident and constitutes most of the demand.

Pipe

Pipe Prices, Page 75

Pittsburgh—Pipe activity is better than expected, production and business approximating December levels. Standard pipe is moving well from jobbers, but reordering is curtailed by inventory reductions. Oil country goods are slow but unchanged and mechanical tubing orders are considerably better as a result of new business from automotive interests. Railroad buying of boiler tubes, while still light, is regarded as more promising.

Cleveland—Cast pipe inquiries and orders are improving. Awards include 900 tons for Akron, O., and 300 tons for Wooster, O. Bids are in on 447 tons for New Boston, O. Sustained operations of pipe foundries are in prospect.

Chicago—Cast pipe is unusually active for this period, the result of numerous PWA projects which must be under construction by Jan. 1. Such business far overshadows privately financed work.

New York — Considerable PWA-financed construction is being rushed for figures and will be reflected in pipe realeses after Jan. 1. Other pipe business to be carried over into next year is substantial, including about 1000 tons for the Metropolitan Life Insurance Co. office annex.

New York city will take bids Dec. 23 on about 3800 tons of cast pipe and fittings. This inquiry will be followed by a second, with indications close to 9000 tons will be bought late this year or early 1939. Only a small increase at best is in prospect for utility purchases of pipe next year.

Cincinnati—Operations of the local plant of United States Pipe & Foundry Co. will be expanded soon after Jan. 1 to fill an order for more than 4000 tons of 6 to 36-inch cast pipe and fittings for enlargement of the Cincinnati waterworks system.

Birmingham, Ala.—Due to increased lettings, mostly in small lots, pipe production is holding at the slightly better pace evident about three weeks ago. The larger plants are holding fairly well to a four-day-a-week schedule, but individual orders are moderate.

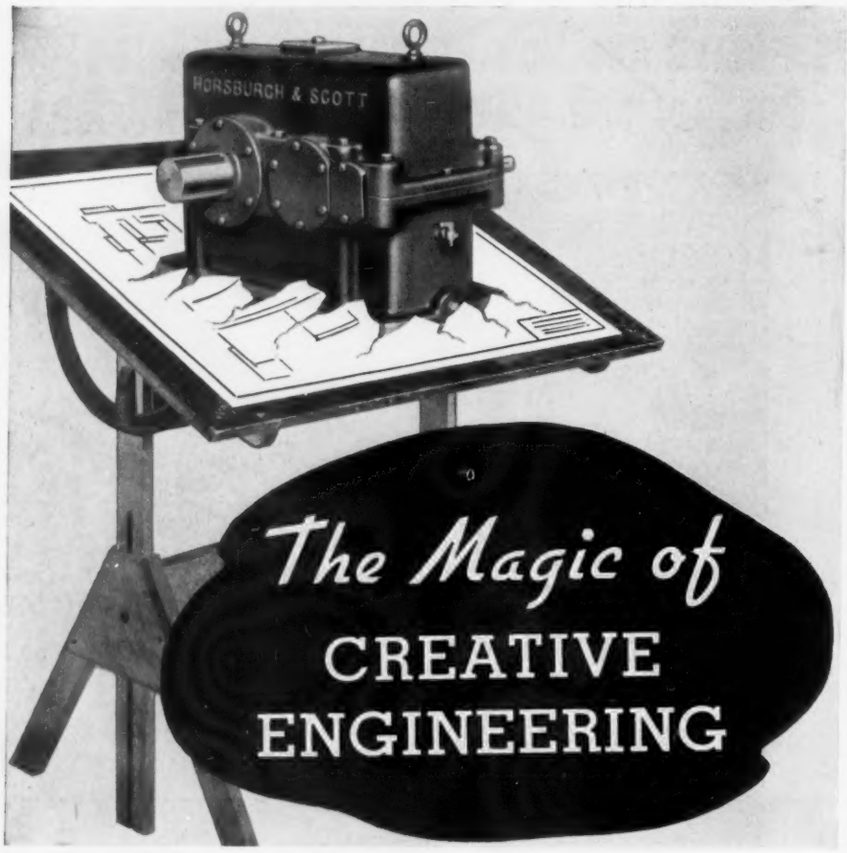
San Francisco—Awards of pipe aggregated 768 tons and brought the total for the year to 30,660 tons, compared with 28,613 tons for the corresponding period in 1937. United States Pipe & Foundry Co. is low on 839 tons of 4 to 10-inch pipe for Hillsborough, Calif.

Cast Pipe Placed

4000 tons, 6 to 36-inch pipe and fittings, Cincinnati, to United States Pipe & Foundry Co., subject to PWA approval; order to be filled at Addyston plant, Cincinnati.

900 tons, 24 and 30-inch, extension to water distribution system, Akron, O., to U. S. Pipe & Foundry Co., Burlington, N. J., through Shullo Construction Co., Akron.

370 tons, waterworks improvement, Wooster, O., to U. S. Pipe & Foundry



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250 tons, 4 to 10-inch, Sweet Home, Oreg., to H. G. Purcell, Seattle.
220 tons, 4 to 8-inch, Seattle, to H. G. Purcell, Seattle.
160 tons, 6 to 12-inch, Bremerton, Wash., to H. G. Purcell, Seattle.
100 tons, 4 to 10-inch, Ephrata, Wash., to unnamed interest.

Steel Pipe Placed

Unstated tonnage, 100 lengths, 20-inch, steel shore pipe, U. S. engineer, Wilmington, Del., to Gary Steel Products Corp., Norfolk, Va.; bids Nov. 28, pro. 58.

Cast Pipe Pending

2700 tons plus, 16 and 20-inch, for Corvallis, Oreg.; bids Dec. 19.
1200 tons, New Britain, Conn.; bids Dec. 20.
1100 tons, Framingham, Mass.; bids Dec. 23.
955 tons, 16-inch and under, Portland, Me.; bids in.
839 tons, 4 to 10-inch, Hillsborough, Calif.; United States Pipe & Foundry Co., Burlington, N. J., low.
530 tons, 12-inch and under, Kennebunk-Wells, Me.; bids in.
447 tons, 8 to 10-inch, waterworks improvement, New Boston, O.; bids in.
400 tons, 2 to 10-inch, Paris, Idaho; Ernest Stettler, Logan, Utah, low on general contract at $60,431.95.
360 tons, 12-inch and under, Newport, R. I.; bids in.
350 tons, procurement division, Newark, N. J.; bids in.
235 tons, various sizes, shaft and tunnel, Rondout-West Branch, Delaware aqueduct; contract 321, board of water supply, New York; bids Dec. 20; work also takes 900 tons miscellaneous cast iron.
130 tons, 4 to 6-inch, water distribution system, Norwalk, O.; bids in.
127 tons, sewage disposal plant, Troy, O.; bids in.
Unstated tonnage, 3600 feet, 6, 8 and 16-inch pipe, LaCrosse, Wis.; bids in.

Wire

Wire Prices, Page 75

Cleveland—Finishing mill operations hold at about 60 per cent, supported principally by automotive demand, although merchant sales are moderately improved. New business is lighter than in November, but the outlook is encouraging.

Boston—Wire buying has declined slightly, with shipments well in excess of incoming tonnage. Finishing operations in some departments are better than 70 per cent and most fourth quarter tonnage will be shipped by the end of the year. While mills have some January tonnage, forward buying has been light in view of unchanged prices. Current orders are for immediate delivery. Consumer inventories in most instances are not heavy, although easing consumption in some directions will result in these users entering the new year with fair stocks. Prices are firm.

New York—Wire buying has declined only slightly below the November rate. Most shipments are going directly into consumption. Inventories are not excessive, and additional automotive business is expected within the next two to three weeks. Spring wire demand from the furniture trade has slackened, but an increase is indicated after the coming Chicago show. While no changes have been made in merchant products prices, sellers are holding more firmly to listed quotations.

Birmingham, Ala.—A reassuring, although rather unexpected, development has been consistent buying of wire products from dealer and jobber sources. Current output is estimated at about 60 per cent.

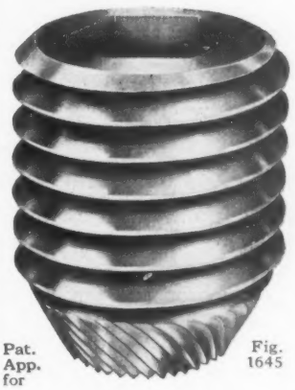
Tin Plate

Tin Plate Prices, Page 74

Larger can companies are placing some fairly substantial tin plate orders for first quarter rolling. Smaller consumers, however, continue to buy on a hand-to-mouth basis. Nevertheless, December book-

Wherever you need a Cup-Point Set Screw that

STAYS PUT



Pat. App. for

Fig. 1645

See the Point

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Behind the Scenes with STEEL

Two Handles

■ It was a wise man who said: "Every tomorrow has two handles. We can take hold of it with the handle of anxiety or the handle of faith." No profound study of the state of the world is needed to show us that a large percentage of the dwellers on this planet of ours have taken hold of tomorrow's handle of anxiety. We have every reason for taking hold of tomorrow with the handle of faith.—*reprinted from the house organ of Hazard Wire Rope Division, American Chain & Cable Co.*

Run Up The Red Flag

■ But just at the moment we are tempted to take hold of tomorrow with the old anxiety handle since we expect to be dragged before the Dies Committee before the week is out. You see, one of our innocent postage paid reply cards has just put us on the spot. In it came last week with this prosecuting message scrawled across it: *Informing you at your own expense.* (We loved that part) *I am a regular reader of your magazine and find your articles and comments extremely helpful in preparing pro communist propaganda. Sincerely, A Communist.* Will you come to our rescue when we are forced to explain to Mr. Dies that STEEL is not an American *Stalin* and that our issues are not secreted by masked comrades to our 68,000 communistic readers every week?

Dinner At 8-18

■ Though hardened by attendance at banquets and other gatherings over a period of years, STEEL's editors still are agape as a result of two of last week's events down in Pittsburgh. On Tuesday evening, at the Duquesne club, stainless steel producers and their guests celebrated the 25th. anniversary of the discovery of this metal with a banquet that easily topped anything the steel industry has seen. Quoting STEEL's most expressive editor: "Not only had the earth, sky and water been combed for the most delicious food and drink, served on a scale that may be described as lavish, stupendous or colossal (whichever you prefer), the affair was held in a setting of sparkling fountains, gorgeous flowers and other decorations literally breath-taking in its sheer beauty". It was the stainless steel industry's way of paying fitting tribute to its metal of eternal beauty.

La Grande Affaire

■ And then, on Thursday, the officers and employes of Carnegie-Illinois Steel Corp. staged the largest "coming-out" party in the history of the steel industry. From industrial centers the country over, guests were brought to Pittsburgh in special cars to inspect the gigantic new Irvin works, latest wonder in steel. You get the whole picture on pages 17 and 40 of this issue, written by editors who continue to marvel at the clocklike precision and liberality with which 1600 guests were conducted through the huge new mill and served at luncheon and the evening banquet. They still feel the warm glow of friendliness, pride and enthusiasm which was displayed throughout the Carnegie-Illinois organization, as they try to forget a week of Alice in Wonderland and buckle down to work on STEEL's awaited Yearbook issue which will be toted into your office the morning of January 3.

Fun On A Dime

■ If you want to have more laughs than are good for you for only 10c, write J. Harry Powers, New P. O. Box 387, Wheeling, W. Va. and ask him for the latest issue of *The Morning Call,* The Premier Privy Publication. What a guy!

—SHRDLU

ings will be well ahead of November. Production holds around 40 per cent.

Estimates vary on probable operations next quarter. Normally an estimated peak of 70 per cent would be conservative, but there is some doubt that this figure will be reached. The outlook is more promising than a year ago, however, since consumers are believed to have absorbed at least 30 per cent more plate during 1938 than they purchased and will enter 1939 with relatively moderate stocks.

Rails, Cars

Track Material Prices, Page 75

Chesapeake & Ohio and Pere Marquette have distributed 28,250 tons of rails, 25,000 tons of 131-pound for the former and 3250 tons of 112-pound for the latter. Division was to Carnegie-Illinois Steel Corp., Bethlehem Steel Co. and Inland Steel Co.

Pittsburgh & West Virginia has advised the interstate commerce commission it plans to scrap a substantial portion of its equipment not under equipment trusts and will ask RFC assistance in replacing it and for repairs. Production of steel castings for Southern Railway freight cars has caused Symington-Gould Corp., Depew, N. Y., to light an open-hearth furnace to supply steel.

General American Transportation Corp., Chicago, has developed a light-weight all-welded steel box car weighing 36,800 pounds, 8500 pounds less than the standard car. Two units will be placed in regular service to demonstrate their value.

St. Louis & Southwestern is asking court permission to spend $1,668,356 for improvements in 1939, including 50 miles of 112-pound rails and 66 freight cars.

St. Louis-San Francisco will build five mountain-type locomotives at its shops at Springfield, Mo., and make various improvements to its other motive power and rolling stock.

Chicago & North Western has asked court permission to buy two 10-car streamlined passenger trains and two diesel locomotives.

The Pennsylvania is inquiring for 15 diners, Capital Transit Co., Washington, for 37 to 50 trolley cars and Delaware Electric Power Co., Wilmington, Del., for 52 trolley coaches.

Car Orders Placed

Norfolk & Western, 1500 steel hopper coal cars, to Bethlehem Steel Co., Johnstown, Pa., and Virginia Bridge Co., Roanoke, Va.

Pullman Co., 40 sleeping cars, to Pullman-Standard Car Mfg. Co., Chicago.

Rail Orders Placed

Chesapeake & Ohio, 25,000 tons 131-pound; 13,600 tons to Carnegie-Illinois Steel Corp., 2500 tons to Bethlehem Steel Co., 8900 tons to Inland Steel Co.

Chicago Great Western, 4200 tons to Carnegie-Illinois Steel Corp., Chicago; 2800 tons of fastenings also placed.

Pere Marquette, 3250 tons 112-pound; 1560 tons to Carnegie-Illinois Steel Corp., 1235 tons to Inland Steel Co., 455 tons to Bethlehem Steel Co.

Car Orders Pending

Chicago & North Western, two 10-car streamlined passenger trains; court permission asked.

Illinois Central, 1000 steel gondolas, 41-foot, 50-ton; bids in.

Locomotives Pending

Chicago & North Western, two diesel locomotives, court permission granted.

Shapes

Structural Shape Prices, Page 74

New York—Low bid on steel, fabricated and erected, estimated 16,500 tons, superstructure, criminal courts building, New York, was $81.40 a ton, quotations being taken on a tonnage basis. This was followed by bids of $82.10, Harris Structural Steel Co., New York, and $83, American Bridge Co., Pittsburgh. Award will go to Bethlehem Steel Co., Bethlehem, Pa. Structural contracts are again up and fabricators' estimating departments are heavily engaged on a large volume of new inquiry, mostly public work. November bookings were the heaviest of the year, preliminary estimates being 153,000 tons. This compares with 137,642 tons, October, and 132,835 tons, November, 1937. An increase in apartment building is noted, including one contract for 2100 tons.

Pittsburgh—Federal aid projects provide the bulk of a substantial flow of new structural inquiries. Largest of these is 6000 tons for an Ohio river bridge, Owensboro, Ky. Several other jobs taking 2000 tons or more also are included.

Chicago—Structural inquiries include several large lots, with demand generally well sustained. Public projects will help to bolster activity the remainder of the winter. Awards are headed by 1730 tons for air corps school buildings, Rantoul, Ill.

Boston—With bids in on 12,000 tons, bridges, Stratford-Milford, Conn., and Portsmouth, N. H.—Kittery, Me., estimates will be taken Dec. 20 on the Jamestown, R. I. span, 7000 tons in the superstructure. Public work up for estimates in the form of buildings is much heavier, indicating structural contracts will be numerous embracing much tonnage early next year.

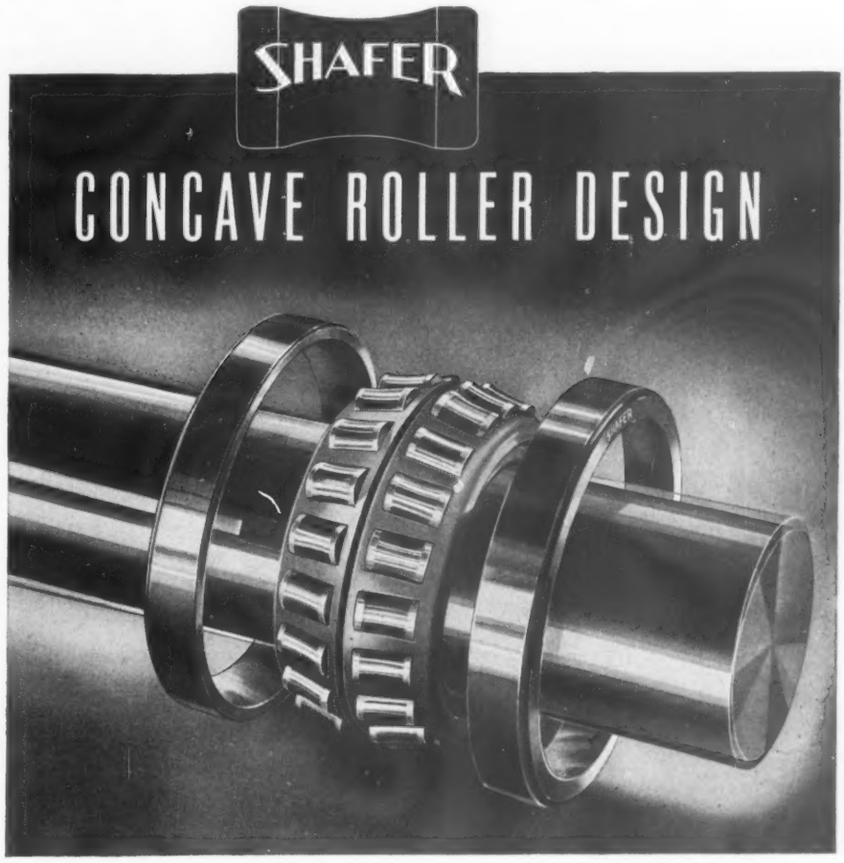
Philadelphia — Placing of public work is speeded up due to Jan. 1 deadline on P.W.A. projects. Defense program is also accounting for considerable work. Fabricated prices continue weak.

Buffalo—With an increased number of projects moving toward the actual construction work, the struc-

Shape Awards Compared

	Tons
Week ended Dec. 17	35,970
Week ended Dec. 10	17,175
Week ended Dec. 3	49,388
This week, 1937	5,418
Weekly average, year, 1937	23,251
Weekly average, 1938	21,069
Weekly average, November	23,137
Total to date, 1937	1,198,332
Total to date, 1938	1,053,454

Includes awards of 100 tons or more.



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tural market is headed for an active period. Several jobs are already in the hands of fabricators, but numerous others are now in the foundation stage or on drawing boards, and are scheduled to be awarded in January.

Cleveland — Award is expected momentarily on 1000 tons of bearing piles for the PWA Lake Shore drive improvement project here. Outlook through the remainder of this month and early next year offers considerable encouragement to fabricators. Public work continues to dominate current inquiries, although a slight improvement is noted from private sources. Fabricated prices remain weak.

St. Louis — A number of small awards are reported, with the largest 550 tons for improvements at Granite City Steel Co., awarded to Stupp Bros. Bridge & Iron Co., St. Louis. Yard operations are unchanged at about 30 per cent of capacity. Several highway bridge projects will close early in January.

Birmingham, Ala.—Some disappointment is expressed, particularly among fabricators, over immediate prospects. As the result, there has been some slackening in output of shapes.

Shape Contracts Placed

16,500 tons, superstructure, criminal courts building, New York, to Bethlehem Steel Co., Bethlehem, Pa.; bids Dec. 9; design still incomplete and tonnage required may be more.

2200 tons, viaduct, Austin avenue and Milwaukee railroad tracks, Chicago, to Overland Construction Co., Chicago.

2100 tons, Park Terrace Gardens apartment, Grand Concourse, New York, to Schact Steel Construction Co., New York.

2000 tons, six bridges, including four 50-foot bascules with others taking 110-foot deck plate girders, Cape May, N. J.; also 1200 tons H-piles, 400 tons plates in pier shells, and 1000 tons reinforcing bars; superstructure to Bethlehem Steel Co., and substructure to Brown & Stewart, Philadelphia; bids Dec. 15. Ash, Needles, Howard & Tammen, New York, engineers.

1900 tons, mill buildings, Southern Paper Mill Inc., Lufkin, Tex., to Mosher Steel Co., Houston; through Merritt-Chapman & Scott Inc.

1730 tons, two air corps technical schools, Chanute field, Rantoul, Ill., to American Bridge Co.; through U. S. war department.

1500 tons, reconstruction, roadway, Williamsburg bridge, New York, to American Bridge Co., Pittsburgh, to fabricate for Taylor-Fichter Steel Construction Co., New York.

680 tons, apartment, Park avenue and Thirty-fifth street, New York, to Lehigh Structural Steel Co., Allentown, Pa.

600 tons, state infirmary and nurses' home, Rocky Hill, Conn., to Bethlehem Steel Co., Bethlehem, Pa.

600 tons, bridge, Hutsonville, Ill., to Wisconsin Bridge & Iron Co., Milwaukee.

550 tons, improvements, Granite City Steel Co., to Stupp Bros. Bridge & Iron Co., St. Louis.

525 tons, bridge, Polk county, Iowa, to Des Moines Steel Co., Des Moines, Iowa.

510 tons, state bridge No. 516, Oshkosh, Wis.; to Worden-Allen Co., Milwaukee.

500 tons, naval airplane hangars, San Clemente, Calif., to Western Pipe & Steel Co., Los Angeles.

475 tons, hospital building, Newtown, Conn., to Bethlehem Fabricators Inc., New York; through Topper & Griggs, Hartford.

415 tons, junior-senior technical high school, Auburn, N. Y., to Syracuse Engineering Co., Syracuse, N. Y.

400 tons, Union building, Terre Haute, Ind., to International Steel Co., Evansville, Ind.

395 tons, dispensary, Welfare Island, New York, to American Bridge Co., Pittsburgh; through Silverblatt & Lasker, New York.

310 tons, garage, Washington, to American Bridge Co., Pittsburgh; Harwood-Nebel Construction Co., Washington, general contractor.

300 tons, flood bridges, various locations, Massachusetts, to Bethlehem Steel Co., Bethlehem, Pa.

280 tons, extension to terminal, Inter Island Steam Navigation Co., Honolulu, T. H., to unnamed interest.

240 tons, telephone building, Los Angeles, to Bethlehem Steel Co., Los Angeles.

230 tons, high school, Garfield Heights, O., to Mooney Iron Works, and Builders Structural Steel Co., Cleveland.

225 tons, tunnel supports, Olmsted and Alpine-Draper tunnels, Provo river project, Utah, to unnamed interest.

210 tons, buildings, federal jail, Ashland, Ky., to Ingalls Iron Works, Birmingham, Ala.; Great Lakes Construction Co., Chicago, general contractor.

210 tons, junior high school, Dallas, Tex., to Austin Bros., Dallas, Tex.

200 tons, bridge FAP-488E, Bayfield county, Wisconsin, to Wausau Bridge & Iron Co., Wausau, Wis.

200 tons, bridge, Waupaca county, Wisconsin, to Worden Allen Co., Milwaukee.

180 tons, two automobile testing stations, Washington, to Fort Pitt Bridge Works, Pittsburgh; Harwood-Nebel Construction Co., Washington, general contractor; Rosslyn Steel & Cement Co., Rosslyn, Va., awarded reinforcing steel.

180 tons, engineering building and dining hall, College Park, Md., to Barber & Ross, Washington.

175 tons, main tower platforms, Standard Oil Co. of Indiana, Whiting, Ind., to American Bridge Co., Pittsburgh.

171 tons, San Fernando road bridge, United States engineer office, Los Angeles, proposal 178, to Bethlehem Steel Co., Los Angeles.

171 tons, Verdugo Wash outlet bridge, United States engineer office, Los Angeles, proposal 176, to Bethlehem Steel Co., Los Angeles.

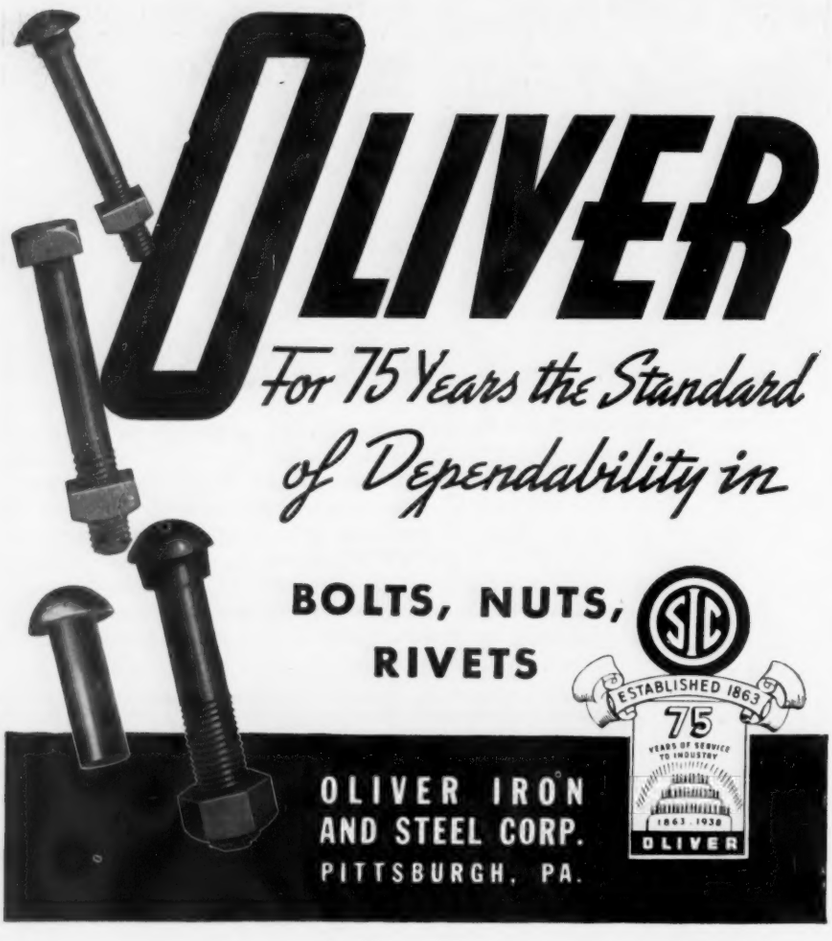
165 tons, addition to manufacturing building, diesel engine division, General Motors Corp., Radford, Mich, to Bethlehem Steel Co., Bethlehem, Pa.

150 tons, woodworking building, Textile Machine Works, Reading, Pa., to Reading Steel Products Co., Reading.

140 tons, Willow street bridge, Benton Harbor, Mich., to Kalamazoo Foundry & Machine Co., Kalamazoo, Mich.

136 tons, overcrossing near Rose creek, Humboldt county, Nevada, to Bethlehem Steel Co., Alameda, Calif.

127 tons, shapes and steel piles, Rule creek bridge, Bent county Colorado, to unnamed interest.



125 tons, addition to gymnasium, Procter & Gamble Co., Cincinnati, to Bethlehem Steel Co., Bethlehem, Pa.
120 tons, administration building, sewage treatment plant, Detroit, to Ingalls Iron Works, Birmingham, Ala.
110 tons, bridge sec. 106SF-1, Lilylake, Kane county, Illinois, to Lakeside Bridge & Iron Co., Milwaukee.
110 tons, addition to city of Cleveland power plant, to Kilroy Structural Steel Co., Cleveland.
100 tons, city hall, Santa Monica, Calif., to Pacific Iron & Steel Co., Los Angeles.
100 tons, bridge WPGH 19-ABCD, Oklahoma, to J. B. Klein Iron & Foundry Co., Oklahoma City, Okla.
100 tons, bridge 151-4-5, Williamson county, Texas, to Austin Bros., Dallas, Tex.

Shape Contracts Pending

7400 tons, including 3500 tons structural steel supports; 750 tons structural steel, and 3150 tons steel sheet piling, shafts and approximately 35,000 feet of tunnel, Rondout-West Branch, Delaware aqueduct, contract 321, board of water supply, New York; bids Dec. 20. Work also takes 60 tons stairs, gratings and ladders; 32 tons brass, bronze and copper, and 32 tons aluminum, doors and frames; also 37,000 feet small-diameter steel pipe for grouting.

7000 tons, vertical lift span bridge, Portsmouth, N. H. — Kittery, Me.; Phoenix Bridge Co., Philadelphia, low, bids Dec. 16.

6000 tons, bridge over Ohio river, Owensboro Bridge commission, Owensboro, Ky.

5000 tons, including floor, superstructure, plate girder bridge, Housatonic river, Stratford-Milford, Conn., American Bridge Co., Pittsburgh, low; bids Dec. 15.

4000 tons, two 350-ton hammerhead cranes, navy yards, Brooklyn and Norfolk, Va., American Bridge Co., Pittsburgh, low, $1,219,000; bids Dec. 14, bureau of yards and docks, navy department, spec. 8979.

3750 tons, structural steel supports, section Rondout-West Branch tunnel, Delaware aqueduct, Fishkill, N. Y., contract 319, board of water supply, New York; Dravo Corp., Pittsburgh, low, $11,431,975; bids Dec. 6.

3000 tons, state infirmary building, 93, Kings Park, N. Y.

2500 tons, gun assembly shop building, navy yard, Washington, American Bridge Co., Pittsburgh, low, $325,940; bids Dec. 14; Bethlehem Steel Co., Bethlehem, Pa., $339,000; Belmont Iron Works, Eddystone, Pa., $376,900.

2000 tons, siphons, Shoshone river and Buck Springs creek, Corbett, Wyo., for bureau of reclamation.

2000 tons, court house, Garden City, N. Y., for Nassau county, New York.

1200 tons, soldiers' home, Newington, Conn., for state.

1200 tons, shapes and plates, caissons, navy yard, Bremerton, Wash.; bids Dec. 21.

1200 tons, pipe line, Shoshone river project, Cody, Wyo.

1100 tons, new six-story building, Bond Clothes, Rochester, N. Y.; bids Dec. 20.

1000 tons, high school, Saginaw, Mich.

925 tons, state highway bridge, Sparta, Wis., closing Dec. 20.

900 tons, bridge over Elk river, Charleston, W. Va.

776 tons, bridge, Ponca City, Okla.

700 tons, bridges, Ecorse, Mich., for Wayne county commissioners, Detroit.

610 tons, 550-foot continuous plate girder bridge, 42-foot roadway with two eight-foot walks, Elmira, N. Y.; bids postponed from Dec. 12 to 19; Robinson & Steinman, New York, consulting engineers.

600 tons, McGilvrey hall, Kent university, Kent, O.

600 tons, hospital building, Clinton prison, Dannemora, N. Y.

600 tons, administration school and dormitory buildings, Mystic, Conn., for state.

600 tons, hospital, Baltimore; John McShane Inc., Philadelphia, general contractor.

500 tons, Bonneville powerhouse superstructure; L. H. Hoffman, Portland, low at $1,169,000.

500 tons, locomotive crane, Mare Island navy yard, California, specification 8982; Orton Crane & Shovel Co., Chicago, low at $273,619.

400 tons, school, Baltimore; bids Dec. 21.

400 tons, six river crossings, Bonneville, Oreg., dam transmission line; Lehigh Structural Steel Co., low.

400 tons, two state highway bridges, Butler, Franklin and Connoquenessing townships, Butler, Pa.; bids Dec. 21.

375 tons, Islay Dairy Co. building, Youngstown, O.; bids Dec. 16.

335 tons, three bridges, Passaic county, New Jersey, William Eisenberg, Camden, N. J., low; bids Dec. 15.

300 tons, tunnel, Southboro, Mass.

265 tons, bridge over Shetucket river, Norwich, Conn.

245 tons, waterworks improvement, Sandusky, O.; National Construction Co.,

NEXT DOOR TO THE MILL

Thomas executive and general sales offices are located next door to the mill. This provides the opportunity for a complete discussion of each and every specification with the operating department. Aware of this fact, our customers in emergency contact us directly at the mill, and invariably they receive immediate information, which under any other arrangement might take several days to obtain. This unusual service permits you to maintain a more efficient production schedule.

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Cleveland, low.
235 tons, stockhouse runway, Republic Steel Corp., Youngstown, O.
225 tons, second section, Chicago subway.
205 tons, garage and police station, Bangor, Me.
200 tons, school, Long Beach, N. Y.; bids in.
200 tons, state highway bridge, PWA-1308-5-F, Southbury, Conn.
200 tons, overpass, Philadelphia, for state.
200 tons, sheet piling, river dock improvement, Sherwin-Williams Paint Co., Cleveland.
200 tons, courthouse, Trenton, Pa.; bids Dec. 20.
200 tons, bridge, Norwich, Conn.; Frank Westcott, Attleboro, Mass., low; bids Dec. 12.
190 tons, bridge, Akron, O.; Shullo Construction Co., Akron, low.
185 tons, bridge, Pike county, Ohio; rebid Dec. 27.
185 tons, grade and high school, board of education, Tioga, N. Y.
150 tons, Liberty tubes traffic elimination, Pittsburgh, for Allegheny county, Pennsylvania.
150 tons, drafting room, New York Shipbuilding Corp., Camden, N. J.
150 tons, building, Procter & Gamble Co., Staten Island, N. Y.
150 tons, bridge, Quogue, N. Y.
125 tons, courthouse, Elkton, Md.; bids Dec. 22.
125 tons, gymnasium, Erdenheim, Md.; bids Dec. 22.
120 tons, grade and high school, board of education, Maine, N Y.
115 tons, addition to high school, board of education, Belmont, Mass.
100 tons, traveling bridge crane, Government air depot, Sacramento, Calif.; bids Dec. 21.
100 tons, central school, Brockton, N. Y.; bids Dec. 23.
100 tons, heating plant, McChord Field, Wash.; bids Dec. 21.
100 tons, sheet steel piling, Port of Seattle Pier 40 improvement; Manson Construction & Engineering Co., Seattle, low.
100 tons, Cleveland Veterans hospital; bids Dec. 27.
100 tons, South Junior high school, Mansfield, O.; Steinie-Wolfe Construction Co., Fremont, O., low.
100 tons, bridge, Van Wert county, Ohio; bids Dec. 27.
Unstated tonnage, trashracks, towers, elevators, Rock Island and Roza projects, Washington state; bids to bureau, Denver, Dec. 21-23.

Reinforcing

Reinforcing Bar Prices, Page 75

New York—Reinforcing bar contracts approximate 3500 tons, including 2500 tons for bridge ramps, Brooklyn. Mesh contracts closed for upstate New York work include 1350 tons with close to 2000 tons still pending or up for bids, closing Dec. 20. New Jersey highway and bridge needs, closing Dec. 28 take 1700 tons, bars and mesh. Inquiries are more numerous, mostly public work. Efforts to strengthen reinforcing bar prices are meeting with indifferent success in this district.

Pittsburgh—Awards continue to hold up well. December volume approximates November and is at the year's high. Private work has dropped off and there is only a negligible amount in new projects. Price situation is better than formerly, with most awards going at or near the quoted price.

Cleveland — Outstanding award went to Patterson-Leitch Co., Cleveland, involving approximately 1000 tons for the PWA Lake Shore drive improvement project here. Private work is at a low ebb, although a moderate improvement is anticipated after the first of the year. Fabricated prices continue weak.

Chicago—The rush to start PWA projects is helping to provide December with the best business for that month in many years. Favorable weather is aiding private work. While bars for a number of jobs now active will not be reflected in shipments immediately, backlogs are being accumulated for delivery early next year. About eight months will be required for awarding all of the 40,000 tons required for the local subway.

Boston — Substantial increase in inquiries includes close to 1650 tons for bridges with several thousand tons involved in sewers, aqueducts and miscellaneous building. New work is coming out heavier than current buying. Needs for public buildings in Connecticut are outstanding, although the trend is upward in the other five states of the New England group. Prices are still soft, and efforts are being made to strengthen quotations without much success.

Philadelphia—Practically all concrete car business pending is for public projects, with the few private jobs appearing taking less than 100 tons individually. The Allentown housing development, costing $1,500,000 and due for bids Dec. 21, is expected to take a large bar tonnage.

Seattle—While no important tonnages were recently placed, business pending includes several sizable lots. The largest project is the Lake Washington, Seattle, pontoon bridge 13,431 tons, new bids Dec. 20. For the Bonneville powerhouse superstructure, 3200 tons will be required;

Concrete Bars Compared

	Tons
Week ended Dec. 17	**11,539**
Week ended Dec. 10	**7,385**
Week ended Dec. 3	**8,547**
This week, 1937	**19,109**
Weekly average, year, 1937	**6,061**
Weekly average, 1938	**6,899**
Weekly average, November	**7,556**
Total to date, 1937	**310,225**
Total to date, 1938	**344,938**

Includes awards of 100 tons or more.

L. H. Hoffman, Portland, is low at $1,169,596.

Reinforcing Steel Awards

2628 tons, ramps, Meeker avenue bridge, Brooklyn, N. Y., to Igoe Bros., Newark, N. J.; through Reiss & Weinsier Inc., Brooklyn.

1000 tons, army barracks, Fort Clayton, Canal Zone, to unnamed interest; general contractor, Robert McKee Co., Los Angeles, at $815,000.

650 tons, two buildings, submarine base, New London, Conn., to Bethlehem Steel Co., Bethlehem, Pa.; Turner Construction Co., Boston, contractor.

550 tons, Oceanic bridge, Rumson, N. J., to unstated fabricator; through Fred T. Ley & Co., New York.

433 tons, including 332 tons wire mesh, runways at Hamilton Field, Calif., to Columbia Steel Co., San Francisco.

432 tons, flood wall, United States engineer, Huntington, W. Va., to West Virginia Rail Co., Huntington, at 2.16c for bulk of material, total $18,704.05; bids Nov. 18, pro. 132.

409 tons, athletic field unit, George Washington high school, San Francisco, to Bethlehem Steel Co., San Francisco.

390 tons, mostly mesh, state highway project RC-4006, Alton-Wolcott, Wayne county, New York, to Bethlehem Steel Co., Bethlehem, Pa.; Warren Bros. Roads Co., Cambridge, Mass., general contractors, $364,259.20; bids Nov. 15, Albany.

354 tons, post office, Pensacola, Fla., to Connors Steel Co., Birmingham, Ala.; Algernon Blair, Montgomery, Ala., general contractor.

350 tons, purchasing agent, quotation 7900, Los Angeles, to Ceco Steel Products Corp., Los Angeles.

340 tons, mesh, highway project RC-3997, Sheldrake-Taughannock Falls, Seneca-Tompkins counties, New York, to American Steel & Wire Co., New York; Bero Engineering & Construction Corp., North Tonawanda, N. Y., general contractor, $216,676.85.

325 tons, bridge, North Platte, Nebr., to Sheffield Steel Corp., Kansas City, Mo.; Missouri Valley Bridge Co., contractor.

308 tons, barracks, invitation 6616-39-23, Presidio, San Francisco, to Gilmore Steel & Supply Co., San Francisco.

300 tons, auditorium, city hall, Topeka, Kans., to Laclede Steel Co., St. Louis; F. M. Spencer, Topeka, Kans., contractor.

300 tons, sewer, Medford, Mass., to Northern Steel Co., Medford, Mass.; Edward M. Matz Inc., Jamaica Plains, Mass., contractor.

292 tons, building, naval air station, Pensacola, Fla., to Truscon Steel Co., Youngstown, O.; Algernon Blair, Montgomery, Ala., general contractor.

248 tons, mesh, state highway project RC-3996, South Schenectady-Mariaville, Schenectady county, New York, to American Steel & Wire Co., New York; Law Bros. Contracting Corp., Herkimer, N. Y., general contractor, $302,748.

213 tons, dormitory and nursery, navy yard, Mare Island, Calif., to Bethlehem Steel Co., San Francisco.

200 tons, addition to General hospital, Pontiac, Mich., to Jones & Laughlin Steel Corp., Pittsburgh, through Taylor & Gaskin, Detroit; Bryant & Detwiler, contractors.

200 tons, women's dormitory, Madison, Wis., to Truscon Steel Co., Youngstown, O.; Maurice Schumacher, contractor.

200 tons, mesh, highway project, RC-3991, Keuka-Penn Yan, Yates county, New York, to Wickwire Spencer Steel Co., Buffalo; Mohawk Paving Co. Inc., Buffalo, general contractor, $268,067.45.

163 tons, mesh, highway project, South Cortland-Homer, Cortland county, New York, to American Steel & Wire Co., New York; Bero Engineering & Construction Corp., North Tonawanda, N. Y., general contractor, $143,879.40.

140 tons, Hall of Records, Modesto, Calif., to Gunn, Carle & Co., San Francisco.

130 tons, bridge, Chicago, Rock Island & Pacific railway, Kismet, Kans., to Truscon Steel Co., Youngstown, O.; Kansas City Bridge Co., contractor.

125 tons, courthouse, Philadelphia, to Bethlehem Steel Co., Bethlehem, Pa.

118 tons, bureau of reclamation, invitation 24677-A, Blaisdell, Ariz., to Bethlehem Steel Co., Los Angeles.

115 tons, high school, Wauwatosa, Wis., to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; Selzer-Ornst, contractor.

110 tons, filtration plant, Highland Park, Ill., to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; Leininger Construction Co., contractor.

110 tons, dormitory for girls, Michigan State Normal college, Ypsilanti, Mich., to Taylor & Gaskin Inc., Detroit; Henry C. Weber Construction Co., contractor.

110 tons, grade separation, Davison avenue at Grand Trunk railroad, to Bethlehem Steel Co., Bethlehem, Pa.; Bryant & Detwiler Co., contractor.

105 tons, high school, Wauwatosa, Wis., to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; Hunzinger Construction Co., contractor.

100 tons, elevator, Swift & Co., Champaign, Ill., to Calumet Steel Co., Chicago.

100 tons, bridge, Cranston, R. I., to Concrete Steel Co., New York.

Reinforcing Steel Pending

13,200 tons, metropolitan district sewer projects, Boston, taking bids.

3800 tons, first section, Chicago subway, Herlihy Mid-Continent Co., general contractor.

3240 tons, power house, Bonneville dam, Oreg.; L. H. Hoffman, Portland, low, at $1,169,000.

2750 tons, second section, Chicago subway, Chicago.

2600 tons, storage building, Mundie & Jensen, Chicago.

2000 tons, 3200-men barracks, Hickam Field, T. H.; bids Jan. 6.

1100 tons, foundations for machine shop, navy yard, Mare Island, Calif.; Ben Gerwick, Los Angeles, low.

1000 tons, substructure and approaches, vertical lift span bridge, Portsmouth, N. H. to Kittery, Me.; Frederick Snare Inc., New York and John Iafolla Construction Co., Dedham, Mass., low on two contracts.

1000 tons, Palos Verdes reservoir for metropolitan water district, Los Angeles; bids returned unopened and new bids to be taken soon.

900 tons, Piscataqua bridge, Kittery, Me.

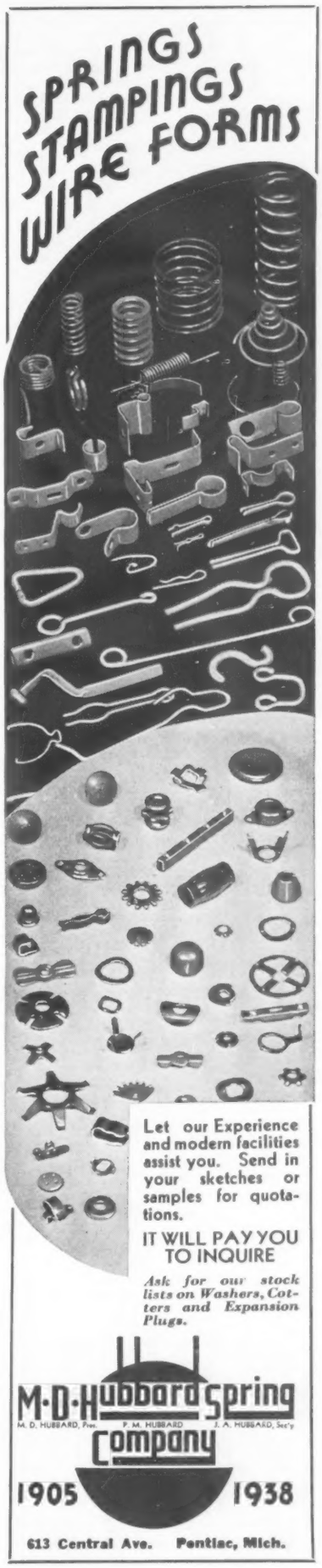
571 tons, unit of Roza irrigation project, Washington state; J. A. Terteling & Sons, Boise, Idaho, low; materials by department.

547 tons, wire mesh, specification 294, metropolitan water district, Los Angeles; bids opened and identical figures quoted.

525 tons, shafts and tunnel, Rondout-West Branch, Delaware Aqueduct, contract 321, board of water supply, New York, bids Dec. 20.

500 tons, barracks, Haloburg, Md.; bids Dec. 22, to U. S. quartermaster, Baltimore.

500 tons, high school building, Rockford, Ill.



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475 tons, five-span reinforced concrete arch bridge, route 6, section 9, Little Falls-Totowa, Passaic county, New Jersey; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

420 tons, East Forty-fifth street viaduct, Seattle; Western Construction Co., Seattle, low.

415 tons, rail steel bars, filtration plant, Sandusky, O.; National Construction Co., Cleveland, low.

400 tons, sewer, Everett, Medford, Mass., metropolitan district sewer project.

350 tons, sewage disposal plant, Chester, Pa.; bids for the third time Dec. 21.

350 tons, bridge over Pennsylvania railroad, Cumberland county, Pennsylvania; bids in to state highway department.

350 tons, bridge, Lake Shore drive, Cleveland.

325 tons, mesh, route 29, sections 7A, 8A and 9B, Chimney Rock to West End avenue, North Plainfield, Somerset county, New Jersey; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

315 tons, mostly mesh, route 4 relocation, section 40, Englishtown road to Gordon's Corner, Monmouth county, New Jersey, 3.884 miles; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

280 tons, social science building, University of Washington, Seattle; Gjarde Construction Co., Seattle, low.

280 tons, Big Creek culvert, Brookpark, Cleveland; Patterson-Leitch Co., Cleveland, low.

265 tons, grade elimination and paving, Farmers boulevard, Queens, N. Y.; Poirier & McLane Corp., New York, general contractor.

264 tons, eight south approach piers, Raritan river bridge, route 35, section 14, Sayreville-Woobridge, N. J.; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

260 tons, apartment building, Marine drive, Chicago.

250 tons, substructure, bridge, Stratford-Milford, Conn.; F. H. McGraw Co., Hartford, Conn., low at $333,980.

250 tons, central school, Brighton, N. Y.; bids Dec. 27.

225 tons, police and fire headquarters, Providence, R. I.

200 tons, barracks structure, McChord Field, Washington; Bailey Construction Co., Seattle, general contractor.

193 tons, foundations, naval air station, Alameda, Calif.; General contract to Healy Tibbets Construction Co., San Francisco.

180 tons, bridge, Pike county, Ohio; bids Dec. 27.

150 tons, barracks, Fort George Mead, Md.; bids Dec. 29.

150 tons, storm drain, Buffalo; Lombardo Bros. Inc., Buffalo, low.

150 tons, mesh, route 37, section 10, South Broad street, Trenton, Park avnue to White Horse, Mercer county, New Jersey; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

145 tons, Bukilding hospital, Middletown, Conn.; O'Driscoll & Grove, Brooklyn, N. Y., low.

132 tons, bridge, Barrett's ferry, Richmond, Va.

105 tons, water works, Denver.

100 tons, infirmary building, Logansport, Ind.

100 tons, mesh, route 4, sections 9A and 4B, widening, Fort Lee to route 2, Bergen county, New Jersey; bids Dec. 28; E. Donald Sterner, state highway commissioner, Trenton.

100 tons dining hall, Veterans home, Lyons, N. J.; bids Dec. 20.

Unstated tonnage, Allentown housing project development, costing $1,590,000; bids due Dec. 21.

Unstated tonnage, bridge, West branch, Narragansett Bay, Jamestown, R. I.; Merritt-Chapman & Scott Corp. was awarded the contract for preliminary construction at $96,424.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 75

Except for revisions on cap screws, set screws and semifinished hexagon nuts, as reported a week ago, bolt and nut prices have been reaffirmed for first quarter. With previous concessions being withdrawn and Dec. 31 the deadline for shipment of business placed at such prices, specifications are being stimulated moderately and for December as a whole may approximate the November volume. A spurt in construction work, traceable to the PWA program, is aiding rivet demand. Outlook for railroad business is more promising.

Pig Iron

Pig Iron Prices, Page 76

Pittsburgh—Pig iron deliveries have declined as a result of the season, and while the outlook for the remainder of the month is dull, a resumption of buying is looked for after Jan. 1. Inquiries as yet give no indication of the extent to which demand may recover next month. Prices are firm.

Cleveland—Shipments continue to decline seasonally. Sellers are accepting first quarter business, although no formal price announcement has been made, except on specialty grades. Automotive interests continue to bolster demand and give no indications of an early letdown.

Chicago—Pig iron shipments are about equal to the rate a month ago, although a 10 per cent decrease for December as a whole is expected. Automotive needs are steady; stove and heating appliance makers are less active; while demand from farm equipment builders is slightly heavier. Little forward buying has appeared.

Boston—Consumers show little interest beyond immediate needs, first quarter orders being light. Most consumers will enter the new year with limited stocks. Most tonnage placed for shipment this quarter has been delivered.

New York—Pig iron releases are moderating, and with first quarter prices reaffirmed consumers are inactive in forward buying. Export demand consists principally of small lots of bessemer and low phos iron for European destination.

Philadelphia — Sellers are quietly taking first quarter orders at unchanged prices without formal announcements. Considerable business booked at old prices will not move until next quarter. Foundry operations, estimated at 35 to 40 per cent, are expected to rise 15 points next period.

Buffalo—The letdown in pig iron shipments this month is regarded as seasonal, with recovery looked for in January. Foundries are work-

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ing off inventories and are expected to resume buying next quarter. Extension of prices also has curtailed new business this month.

Cincinnati—The season is retarding pig iron deliveries and new business. Some melters are sufficiently stocked until after Jan. 1. Word still is awaited of formal opening of first quarter books by southern interests, but consumers show little interest in forward contracting.

St. Louis—Pig iron deliveries are off moderately since a month ago, but a gain in specifications points to larger December shipments to the year's highest level. Foundry operations are well sustained, showing resistance to seasonal influences, while the January outlook is favorable. Inquiries for first quarter iron are increasing gradually.

Birmingham, Ala.—With 16 blast furnaces at virtual capacity, most of the product for conversion into finished steel, pig iron production holds steady, with no early change of consequence indicated. The Tennessee company, which is pushing all eight of its furnaces, is believed able to accumulate a little iron for possible reserve needs.

Toronto, Ont.—Melters generally are interested only in spot needs, with pig iron orders totaling about 2000 tons weekly. Few first quarter inquiries have appeared, but next year's outlook is bright. Large contracts for war supplies for Great Britain are in prospect.

Scrap

Scrap Prices, Page 78

Pittsburgh—Scrap quotations are unchanged in a market that is expected to continue dull the remainder of this month. Mill supplies are regarded adequate for the present, and no new buying is reported. Shipments continue against old orders.

Cleveland—Shipments of scrap continue on contracts but new business is light and some melters are limiting shipments. Most railroad material on recent lists has gone east for export. Prices here and at Youngstown, O., are strong but unchanged.

Chicago — Scrap has a stronger undertone here despite continued quiet. Mills are expected to remain out of the market the next two weeks, and the trade looks for little further change in quotations this month. No. 1 heavy melting steel continues firm at $13.50 to $14. Sustained consumption of scrap points to renewed buying early next quarter.

New York—Scrap movement is confined largely to export tonnage which is being bought against old orders at unchanged prices. A New Jersey mill placed a moderate tonnage of No. 1 steel at $15.50. European cartel will act this week on the proposed purchase of about 150,000 tons monthly. A large tonnage pending for Japan has yet to be closed.

Philadelphia — Scrap prices are stronger on continued buying for export and a domestic purchase of No. 1 steel at $15.50. A number of other grades also are up 50 cents. Buying against export orders is reported on the basis of $14 for No. 2 and $15 for No. 1, with a premium of 50 cents paid for the latter in some instances. The report that congress may place an embargo on scrap exports is speeding the foreign movement. December exports are expected to approximate 20,000 tons, an increase over November.

Buffalo — Inactive demand for scrap has moved prices down 25 cents on steelmaking grades. No. 1 steel now is $13.75 to $14.25, with the usual $2 differential on drop forge flashings, compressed sheets and bushelings. A leading consumer is maintaining a bid on No. 1 steel within the prevailing price range but is holding up shipment on any orders placed. A quiet market is anticipated until next month.

Detroit—Easiness continues, occasional sales indicating a drop of 50 cents in some grades. For the present, prices are unchanged except for 25-cent reductions in industrial heavy melting and loose clips.

Cincinnati—Scrap is less active and prices of most grades are down 50 cents. Some district mills are taking small shipments, meanwhile digging into stocks. Dullness in the market is regarded as largely seasonal.

St. Louis—Scrap prices are easier here, with heavy melting steel off 25 to 50 cents. Material is coming out less freely, however, and with the removal of an accumulation of distress scrap through the purchase of 4000 tons of heavy melting by a local mill, the market is in improved position.

Toronto, Ont.—Scrap prices show a firmer tone. Dealers are offering $10 to $11 for No. 1 heavy melting steel, with some holding to $11. Machinery cast is strong at $12. Demand for both grades is active, while offerings are relatively light, due largely to the season. Yards are fairly well stocked.

Warehouse

Warehouse Prices, Page 77

Cleveland—Warehouse shipments are about on a par with November, but the holiday period lull is expected to bring the December total 5 to 10 per cent below last month.

Chicago—Instead of the downward trend common to this period, sales are well sustained, some interests reporting business equal to the rate a month ago. The usual holiday slump is anticipated.

New York—Business is holding better than expected. While some tapering over the year-end is

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thought likely, volume so far in December is slightly heavier than a month ago.

Philadelphia — Business the first half of December showed little change from November and was heavier than a year ago. Diversified buying indicates improved business among smaller consumers.

Buffalo — Warehouses are encouraged by the resistance shown by sales to the usual letdown at this period. December business to date is about equal to that a month ago.

Detroit—Demand continues seasonally light. January outlook is uncertain.

Cincinnati — In contrast to the usual downward trend in December, sales are heavier than a month ago. Industrial needs are sustained or higher, but public works jobs are furnishing little business to warehouses.

St. Louis—Sales are steady, seasonal influences so far having been little in evidence. Open weather has helped business in roofing material and fencing in rural areas. Coal mines and railroad shops are slightly better buyers.

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GARAGE IN CONNECTION

Steel in Europe

Foreign Steel Prices, Page 77

London — (*By Cable*) — Lower prices on pig iron and steel have been announced for first six months of 1939 by the British Iron & Steel Federation, effective Jan. 1. The reductions from present prices are as follows: Basic pig iron, 7s 6d; hematite pig iron, 12s 6d; billets, 10s; bars and hoops, 12s; rails and structurals, 12s 6d; plates, 17s 6d; sheets £1; galvanized sheets £1 5s; steel and iron scrap, 8s 6d.

Markets in Great Britain are quiet but some inquiries for 1939 delivery are appearing. Denmark has placed a rail tonnage with Dorman, Long & Co. Ltd. A contract for a large tonnage of steel pipe for South Africa has been placed here.

Steel ingot production in November was 860,000 tons, an increase of 5200 tons over October. Pig iron output was 461,500 tons, a decline of 7900 tons from October. Foreign trade showed an increase, exports totaling 181,228 tons, compared with 162,500 tons in October, an increase of 18,728 tons. Imports were 65,862 tons in November, a gain of 13,462 tons over 52,400 tons in October.

Continental markets are reported quiet. Belgian makers have booked a contract for rails for Brazil.

Nonferrous Metals

New York—Outstanding development in nonferrous metals last week was the abrupt change in sentiment to the bullish side. The London markets displayed a much firmer tone, due in part to the advance in Wall street around midweek. Consensus now is that recovery after the turn of the year will be at a

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Dec.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
10	11.25	11.37½	10.77½	45.95	46.10	4.75	4.60	4.50	20.00	11.50	35.00
12	11.25	11.37½	10.77½	45.95	46.10	4.75	4.60	4.50	20.00	11.50	35.00
13	11.25	11.37½	10.77½	45.95	46.10	4.75	4.60	4.50	20.00	11.25	35.00
14	11.25	11.37½	10.77½	46.05	46.20	4.75	4.60	4.50	20.00	11.25	35.00
15	11.25	11.37½	10.77½	46.40	46.55	4.75	4.60	4.50	20.00	11.25	35.00
16	11.25	11.37½	10.77½	46.00	46.15	4.75	4.60	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.42½-6.55
Cleveland 6.37½-6.62½
Chicago 5.75-6.00
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 7.75-8.00
Cleveland, No. 1 ..... 7.62½-7.87½
Chicago, No. 1 ..... 7.37½-7.62½
St. Louis 7.75-8.00

Composition Brass Borings

New York 5.60-5.85

Light Copper

New York 6.25-6.50
Cleveland 5.87½-6.12½
Chicago 5.75-6.00
St. Louis 6.00-6.25

Light Brass

Cleveland 3.25-3.50
Chicago 3.62½-3.87½
St. Louis 4.00-4.25

Lead

New York 4.00-4.25
Cleveland 3.50-3.75
Chicago 3.50-3.75
St. Louis 3.75-4.00

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.25-2.50

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 7.75-8.00
Clips, soft, Cleveland 13.25-13.50
Mixed cast, St. Louis 7.50-8.00

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads. 11.00
Standard No. 12 aluminum ... 13.50-14.00

faster pace than previously expected.

Copper—With the foreign cartel reducing output to 105 per cent as of Dec. 15 and planning to reduce it to 100 per cent on Jan. 1 coupled with unconfirmed reports that domestic production will decline unless sales pick up, demand abroad was much heavier. Copper for export sold here as high as 10.45c, c.i.f. compared with the previous week's close of about 10.25c. Electrolytic held steady in a quiet market at 11.25c, Connecticut. Copper and brass mills reduced prices on most products containing zinc approximately ⅛-cent and henceforth will quote to the exact fraction of a cent rather than by approximate eighths.

Lead—Sales increased to an active pace with inquiry on some days exceeding producers' daily intakes. Prices held steady here on the basis of 4.60c, East St. Louis.

Zinc—Sentiment improved on the slight upward trend in London prices and the weekly reports on sales which showed that they were heavier than daily reports indicated. Prime western held at 4.50c, East St. Louis.

Tin — American consumers have shown more interest in covering needs following the improved price tone in London. Operations at plate mills are expected to increase to around 65 per cent of capacity soon from the current 35 to 40 per cent level. Straits spot jumped to around 46.40c after midweek and closed at 46.00c.

Equipment

New York—With machine tool orders usually for one or two units at a time, largely from the metal-working industries and some from airplane builders, there is a slight recession in volume, without a sharp drop. A considerable volume previously quoted will be carried over into the new year as active but still unplaced. As most machine tool business for months has been largely for replacements with higher productive units, increase in industrial construction and expansion expected during 1939 is likely to be reflected in new tool purchases.

Boston—Scattered domestic orders for machine tools, notably for grinding equipment, are for one or two units and the number of such purchases are sufficient to hold production schedules, although foreign backlogs make this possible with numerous New England shops. Slack resulting from the recent slowing down in domestic orders is balanced by export demand.

Washington—Contracts for locomotive cranes for navy yards totaling $278,923.35 have been awarded by the bureau of yards and docks, navy department: Ohio Locomotive Crane Co. five 30-ton units for the yards at Boston, Brooklyn, Charleston, S. C., and Puget Sound, Wash., at $100,513.35; Orton Crane & Shovel Co., eight 40-ton locomotive cranes for Portsmouth, Va., Mare Island, Calif., Philadelphia and Portsmouth, N. H., at $178,410.

Construction and Enterprise

Ohio

CANTON, O. — Spun Steel Corp., F. G. Harrison, president, has let contract to Schmader Bros., Canton, for construction of a one-story, 4100-square foot addition to its factory at cost of $8,000. Company manufactures automobile jacks.

CANTON, O. — Union Metal Mfg. Co., maker of ornamental lighting standards, announces plans to construct a 60 x 340-foot addition to its plant, construction of which is to begin immediately.

CELINA, O. — City, W. R. Cook, manager, has plans maturing and probably will advertise in January for bids on separate contracts for construction of sewage disposal plant and sewer system to cost about $91,300. Consulting engineer, Paul A. Uhlman, Columbus, O. (Noted Oct. 24.)

CLEVELAND — Triplex Screw Co., A. F. Weber, president, has let general contract to C. Schummelman, 1173 Sylvania road, Cleveland Heights, for structural work on one-story, 90 x 200-foot brick and steel addition to its factory. Total cost estimated at $60,000. (Noted Nov. 28.)

EAST LIVERPOOL, O. — City, James Hall, service director, has plans to convert its present steam-operated waterworks plant to electrical operation and control and to make general repairs; project to cost $66,426. Consultant, Chester Engineering Co., Pittsburgh.

EAST PALESTINE, O. — City, Elmer Dishong, service director, is taking separate bids due at noon, Dec. 22, on contracts B and C of equipping and piping its power plant; includes turbine, generator, exciter, control panel, pumps, feed water heater, steam connections and piping. Cost about $95,752. Consulting engineer, F. S. Barckhoff Sr., city hall, Salem, O. Bank draft or bond 5 per cent of bid. (Noted Dec. 5.)

SANDUSKY, O. — Pennsylvania railroad has plans in progress for construction of a $350,000 coaling station on Sandusky bay, complete with handling equipment. Company engineering department, 516 West Jackson boulevard, Chicago, in charge.

ZANESVILLE, O. — Zane Refining Co., P. N. Faine, secretary, plans to build a 1500-barrel crude oil refinery on a 40-acre site along Muskingum river at cost of about $500,000. Project will include rail sidings, marine docks, cracking units, power plant and storage facilities.

Pennsylvania

SHARPSVILLE, PA. — Borough, Mamie Robins, secretary, takes bids due 7:30 p.m., Dec. 23, on construction of a sewage disposal plant costing $118,000. Project involves Imhoff tanks, trickling filters, sludge bed, humus tank, pumping station, aerators and digesters. Chester Engineering Co., Pittsburgh, consulting engineer.

WILSON, PA. — Borough, J. B. Acton, secretary, is taking bids to Dec. 22 on construction of a force main, pumping station and electrical equipment for the latter. Gannett, Eastman & Fleming Inc., Harrisburg, Pa., engineer. (Noted Nov. 11.)

Michigan

ADRIAN, MICH. — City, G. W. Armstrong, mayor, plans to construct a sewage disposal plant costing $125,000 and involving mains, water supply tank, laboratory, blower building, aera-

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tion tanks, digestors and settling tanks. Walter Frazier, city engineer.

DETROIT — Masco Screw Products Co., 2700 Franklin street, Alexander Manoogian, president, suffered a fire at its plant which destroyed interior of building and equipment for a total loss estimated at $200,000.

FLINT, MICH. — Flint housing authority plans to build a central heating plant in connection with its $800,000 housing project consisting of group of two-story buildings. Project has federal financing.

Illinois

CHICAGO — International Filter Corp. has awarded general contract for constructing a one-story, 125 x 140-foot factory costing about $50,000 to Heidel & Beck, 6235 South Michigan avenue. (Noted Oct. 17.)

SOUTH ELGIN, ILL. — Winnebago Distilling Co. is taking bids on construction of a power plant and storehouses in connection with a $750,000 distillery project. P. Gerhardt, South Elgin, architect and engineer.

Indiana

JASPER, IND. — Board of public works, J. Giesler, clerk, plans to construct an addition and make improvements in the municipal power plant at cost of $71,400. Will install water-tube boiler and piping. J. M. Rotz Engineering Co., Indianapolis, consulting engineer.

Alabama

ANNISTON, ALA. — City water board receives bids Dec. 22 for construction of additions and improvements to municipal water plant. Polglaze & Basenberg, Birmingham, Ala., consulting engineers.

District of Columbia

WASHINGTON — Navy department, bureau of supplies and accounts, takes bids to Jan. 6 for turbine pumps (schedule 5055); engraving machine (schedule 5063); milling machines (schedule 5067); engine lathes (schedule 5070); and pedestal grinders (schedules 5077 and 5078).

Kentucky

FULTON, KY. — Hickman-Fulton Counties Rural Electric Co-operative Corp. plans a $100,000 line construction project involving 105 miles of lines and will soon let contract. Thomas H. Allen Engineering Co., Memphis, Tenn., consultant.

Florida

FT. PIERCE, FLA. — City, E. G. Gustafson, manager, will receive bids Dec. 23 for installing wells, mains and electrical equipment in its water system. Funds available total $100,000.

Georgia

ATLANTA, GA. — Georgia Power Co., Chief Engineer Hammond, will spend during 1939, $2,000,000 for distribution lines, $1,000,000 for substations and transformers and improvements at various power houses in its generating system.

CAIRO, GA. — Grady County Electric Co-operative has been allotted $100,000 REA grant in the prospective construction of 116 miles of rural power lines in two counties.

CLARKSVILLE, GA. — Habersham Electric Membership Corp., J. P. Fitts, president, is receiving bids for the construction of 185 miles of primary and secondary lines in four counties. J. B. McCrary Engineering Corp., Atlanta, Ga., engineer.

DALTON, GA. — North Georgia Electric Membership Corp. has REA allotment of $312,000 for building power lines to serve 677 customers in seven counties.

MILLEDGEVILLE, GA. — McElrath Mfg. Co. plans to build a new boiler house at its mill. Will cost more than $2[illegible]000 with boiler units and auxiliary equipment.

ROME, GA. — City, S. S. King, manager, is taking bids for waterworks improvements costing $300,000 and including construction of a three-story building with equipment. Roberts & Co., Atlanta, Ga., consulting engineers. (Noted Nov. 21.)

Mississippi

KOSCIUSKO, MISS. — City, board of aldermen, receives bids Dec. 23 for furnishing materials and constructing an electric light and power distribution system estimated to cost $96,000. A. S. Brumby, Starkville, Miss., consultant.

South Carolina

GREENVILLE, S. C. — PWA has allotted a grant to the city and it is taking bids to Dec. 30 on sewage disposal plant project costing about $57,000. J. E. Sirrine & Co., Greenville, engineers.

Louisiana

ABITA SPRINGS, LA. — Town, John Leverson, mayor, will install a sanitary sewage system costing about $67,500. Has PWA grant and votes Jan. 17 on bond issue to provide balance of funds.

Missouri

KIRKWOOD, MO. — City, A. S. Kinyon, mayor, has been allotted PWA grant of $55,000 in the projected rebuilding of a municipal light and power substation for which a bond issue of $68,000 is already approved. (Noted Nov. 14.)

Arkansas

FORRESTER, ARK. — Caddo River Lumber Co. plans to rebuild and equip its powerhouse and planing mill which were recently destroyed by fire at loss of about $200,000.

Oklahoma

NOWATA, OKLA. — Municipality, L. Horn, clerk, is taking bids due Dec. 23 on main extensions, valves, hydrants and motor-driven centrifugal pump costing total of $17,000; until Dec. 22 on construction of a sewage disposal plant to cost about $27,000. Long & Co., Oklahoma City, Okla., consulting engineers on disposal plant.

Wisconsin

CUDAHY, WIS.—Board of vocational education, James Keller, clerk, has awarded general contract on addition to vocational school costing $65,000 to Czaplewski Construction Co., 5036 West Blue Mound road, Milwaukee.

STEVENS POINT, WIS. — Portage county board has plans to construct a county highway garage, machine shop and warehouse. Will probably mature in January. M. J. Mersch, highway commissioner.

Minnesota

NEW PRAGUE, MINN.—City, George Sticha, clerk, is accepting bids to 8 p. m., Dec. 23, on construction of a 150,000-gallon steel tower and elevated iron tank. Certified check 5 per cent. Joseph Rynda, Montgomery, Minn., engineer.

Texas

AUSTIN, TEX. — City, Guiton Morgan, manager, receives bids Dec. 21 for

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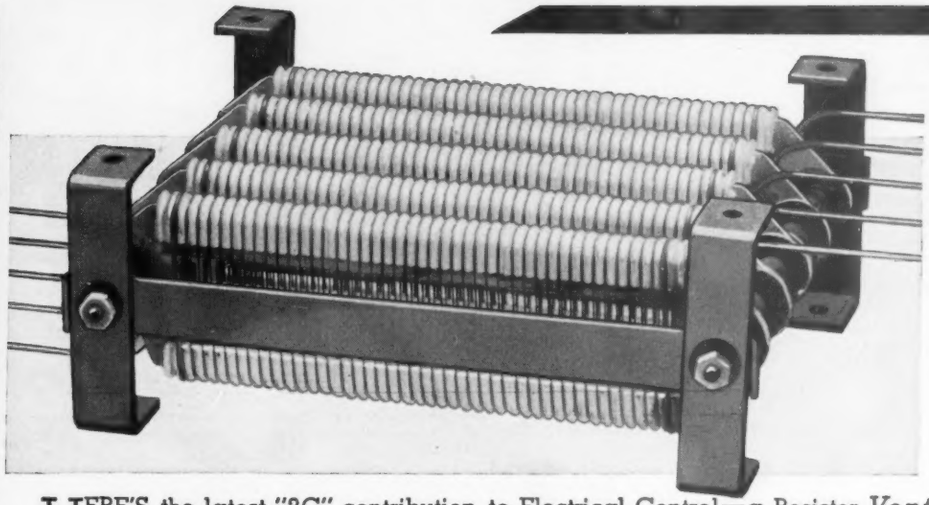

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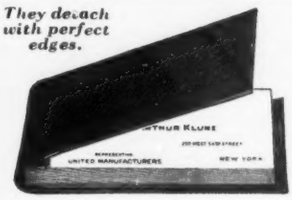

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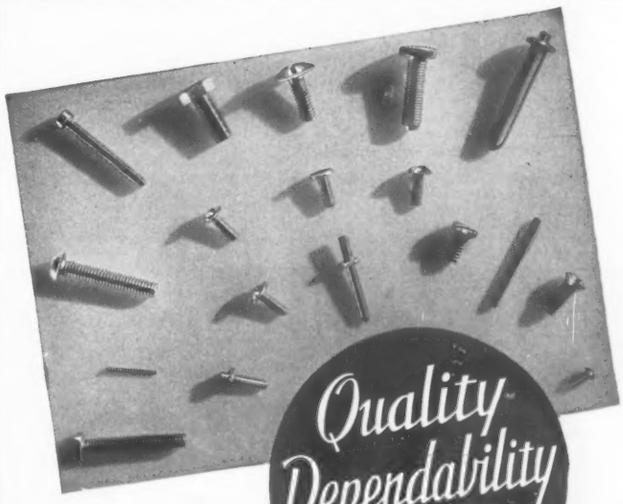

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alterations and repairs to turbine room, pump building and shops at the municipal power plant. Walter E. Seaholm, city hall, supervising engineer.

AUSTIN, TEX. — City, Guiton Morgan, manager, takes bids Dec. 21 for construction of reservoir and making improvements in its water system. Walter E. Seaholm, city hall, supervising engineer.

BAIRD, TEX. — City, H. Schwartz, mayor, is accepting bids in the construction of a light and power plant for which $151,056 is available. Albert C. Moore & Co., San Antonio, Tex., consulting engineers. (Noted Oct. 17.)

BLANCO, TEX. — City, R. E. Stubbs, mayor, accepts bids about Dec. 28 for construction of electric distribution system costing $27,600. Application filed with PWA for grant in project. Homer Trimble, Austin, Tex., engineer.

BRYAN, TEX. — City sets tentative date Dec. 23 for opening bids on construction of water supply system costing $422,400. Freese & Nichols, Ft. Worth, Tex., consulting engineers. (Noted Oct. 31.)

CROSBYTON, TEX. — City, C. M. Huddleston, mayor, is taking bids for construction of an electric generating plant and distribution system with all needed equipment; available funds total $87,000. Municipal Engineering & Finance Co., Dallas, Tex., consulting engineer. (Noted Dec. 12.)

CUSHING, TEX. — Town, W. E. Davis, mayor, receives bids Dec. 21 for constructing projected water and sewage system for which $25,000 is available. Joe J. Rady, Ft. Worth, Tex., consulting engineer.

FLOYDADA, TEX. — City, E. C. Duncan, mayor, is accepting bids on construction of diesel electric generating plant, including building, distribution system, etc. PWA has allotted loan of $83,000 and $67,735 grant on project. Carl C. Cox, Amarillo, Tex., consulting engineer. (Noted Oct. 10.)

FREDERICKSBURG, TEX.—City, Edward Kraskopf, mayor, receives bids on construction of an electric system for which PWA has allotted loan and grant totaling $70,000. Bond issue also approved by voters. Joe E. Ward, Wichita Falls, Tex., engineer. (Noted Oct. 10.)

LLANO, TEX. — City, J. H. McLeon, mayor, receives bids Dec. 20 for constructing complete electric distribution system to cost $70,000. Power to be purchased from Colorado Power Co. Joe E. Ward, Wichita Falls, Tex., consulting engineer in work. (Noted Sept. 26.)

LOCKHART, TEX. — City, N. H. Clark, mayor, receives bids about Dec. 21 for an electric distribution system to cost about $96,000 and for which bond issue is voted. Homer Trimble, Austin, Tex., consulting engineer. (Noted Oct. 24.)

LUFKIN, TEX. — Southland Paper Mills, E. L. Kurth, president, will begin construction soon after Jan. 1, 1939, of a newsprint paper plant costing over $3,000,000. Work to be directed by George F. Hardy, 305 Broadway, New York, engineer.

VAN ALYSTYNE, TEX. — Grayson-Collin Electric Co-operative Inc. has been allotted $134,000 by REA for construction of 148 miles rural electric power lines in Grayson county.

WHITESBORO, TEX. — REA has granted $100,000 allotment to West Grayson Electric co-operative for constructing 100 miles of rural lines.

Kansas

CLAY CENTER, KANS. — REA has allotted $276,000 to the C & W Rural Electrification Co-operative association to finance construction of 275 miles rural transmission lines in two counties.

COUNCIL GROVE, KANS. — Flint Hill Rural Electric Co-operative association has received $523,000 REA allotment for constructing 538 miles of power transmitting lines in four rural counties. Paulette & Wilson, Salina, Kans., consulting engineers.

Nebraska

HARTINGTON, NEBR.—REA has allotted $139,000 to the Cedar-Knox Rural Public Power district, M. L. White, secretary, to finance construction of 124 miles of rural transmission lines in two counties. Mead, Ward & Hunt, Madison, Wis., consulting engineers.

PAWNEE, NEBR.—City takes bids to Dec. 27, 10 a. m., on construction of a new water treatment plant to cost about $28,930. Burns & McDonnell Engineering Co., Kansas City, Mo., consultant. (Noted Sept. 12.)

TEKAMAH, NEBR. — REA allotted $140,000 to Burt County Rural Public Power district to enable construction of 92 miles of lines in four counties. H. H. Henningsen Engineering Co., Omaha, Nebr., consulting engineer.

Iowa

FARMERSBURG, IOWA — PWA has approved grant to the city, Otto Fuelling, mayor, to aid in const. ..tion of a waterworks to cost $25,840. Burd, Bartels, Eitel & Cullen, Dubuque, Iowa, engineers.

Montana

LEWISTOWN, MONT.—City, George Waltz, clerk, plans to construct a sewage plant and probably will soon take bids. Consulting engineer, L. R. Stockman, Baker, Oreg., is drawing up plans.

Idaho

MOSCOW, IDAHO—City, Ray Carter, clerk, has called bids Dec. 24 for constructing a sewage treatment plant estimated to cost $68,322. (Noted Sept. 12.)

Pacific Coast

LONG BEACH, CALIF. — American Wholesale Hardware Co. is building a 100 x 250-foot warehouse to cost $32.500,

LOS ANGELES—Skyline Steel Service Inc. has been incorporated with capital of $25,000. Attorney, P. G. McIver, Montebello, Calif.

LOS ANGELES—Speedrill Mfg. Corp. has been organized with 100,000 shares capital stock of no stated value by directors G. E. Brebensen, B. A. Walter, G. W. Fenimore, R. Snyder and N. Hill, all of Los Angeles.

SACRAMENTO, CALIF.—School district, junior college group, takes bids on constructing and equipping an aeronautics building costing $80,000 and an engineering shop costing $60,000. H. J. Devine, Cronan building, architect.

PORTLAND, OREG.—Bonneville authority, J. D. Ross, administrator, will call bids in 60 days for lines and substations from the power project into Oregon and Washington. Estimated cost, $7,000,000.

SEATTLE — Dricer Inc. has been formed with $100,000 capital by E. S. Bunker and associates to deal in machinery and equipment.

SEATTLE — Isaacson Iron Works is fabricating materials to go into a 24 x 180-foot addition being built by Bethlehem Steel Co. at its Andover street shipping building.

Canada

NORANDA, QUE.—National Syndicate of Electricity has awarded contract to Dufresne Construction Co., 1852 Pie IX building, Montreal, for constructing a dam, power plant and transmission lines costing about $1,500,000.

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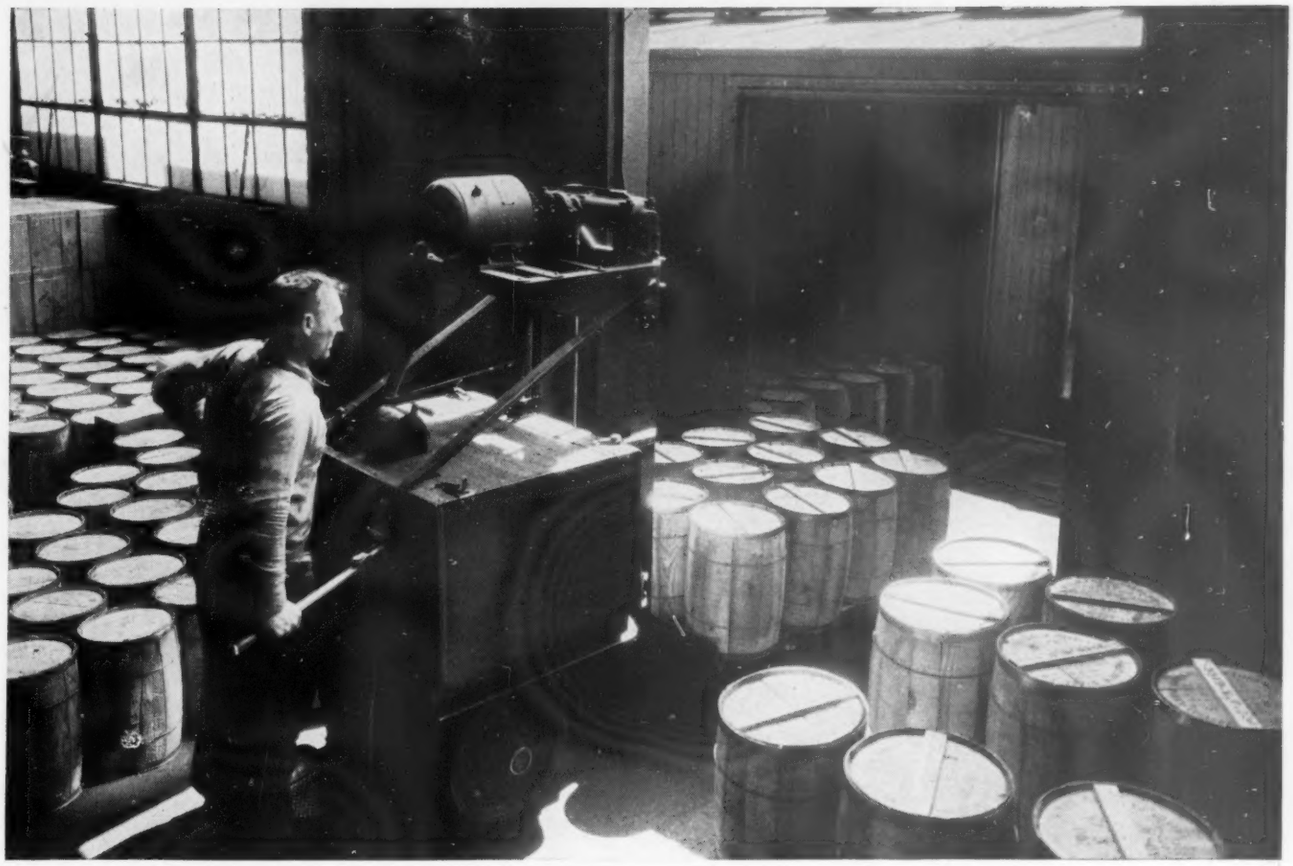

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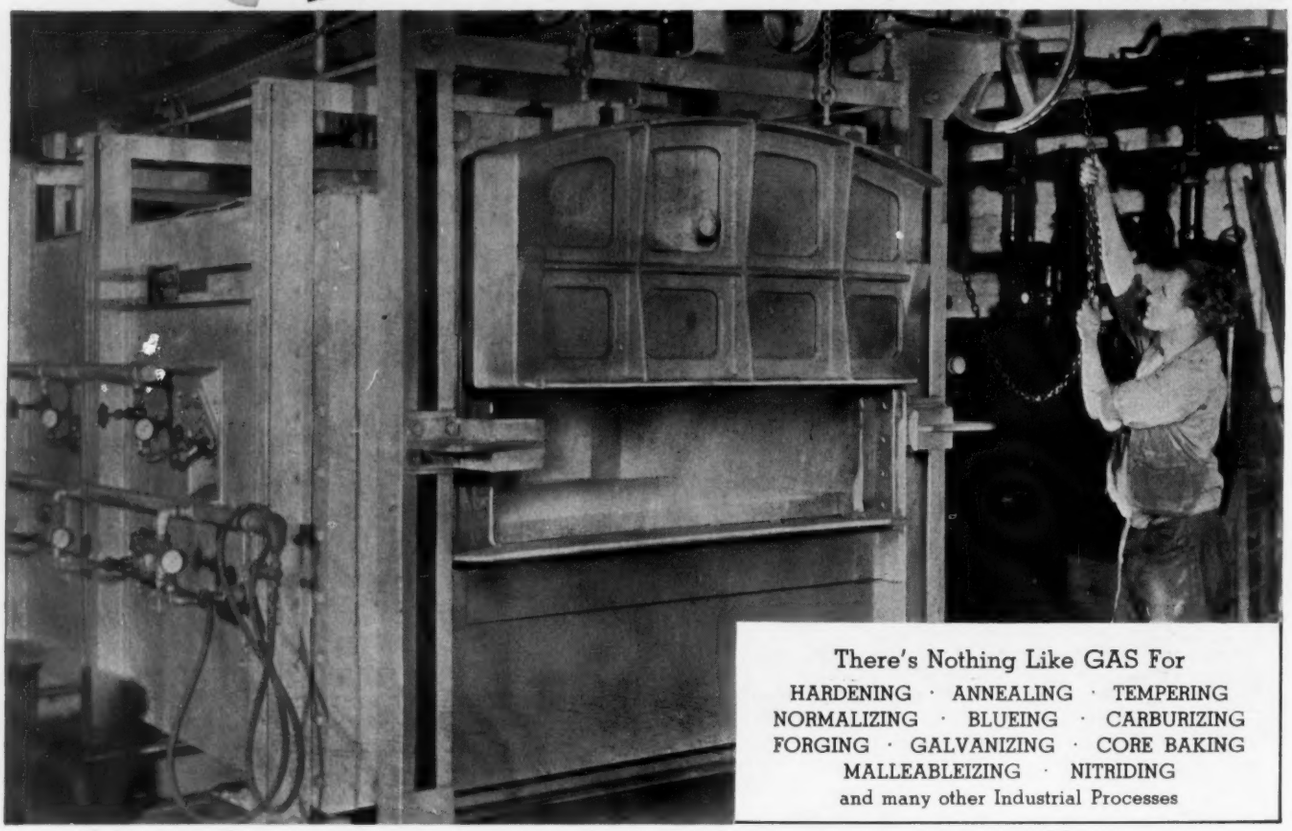

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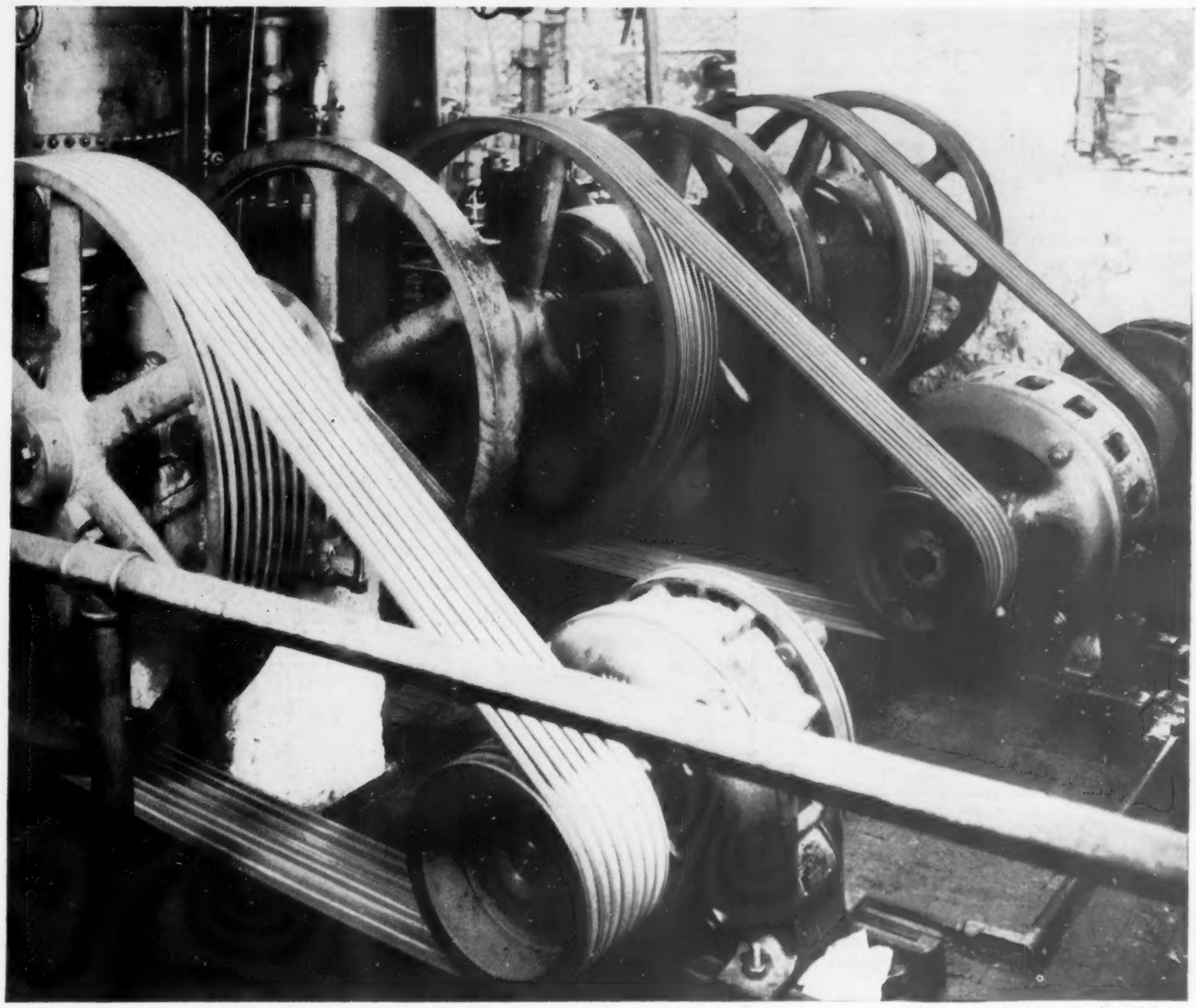

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Medium-Carbon Ferromanganese
Spiegeleisen
Manganese Metal
Manganese-Copper
Miscellaneous Manganese Alloys

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Ferrosilicon 50%
Ferrosilicon 75%
Ferrosilicon 80 to 90%
Ferrosilicon 90 to 95%
"Silvaz" Alloy
Silicon Metal
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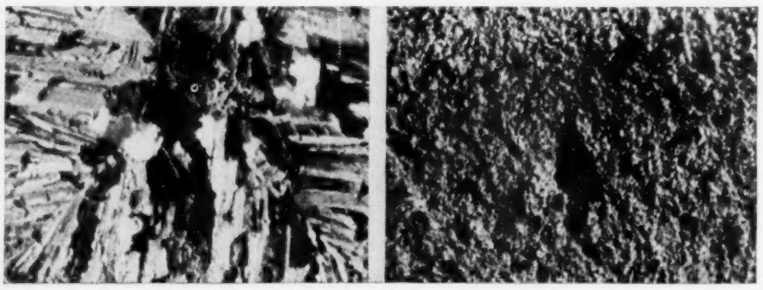
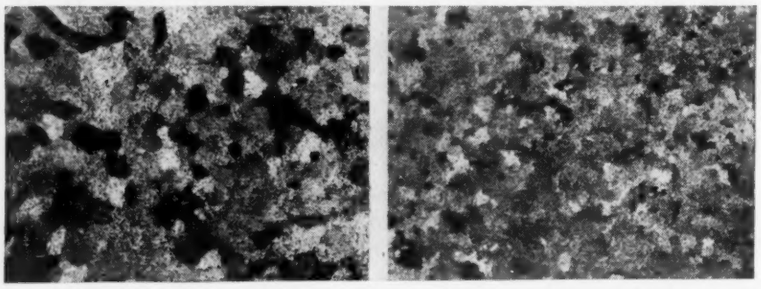
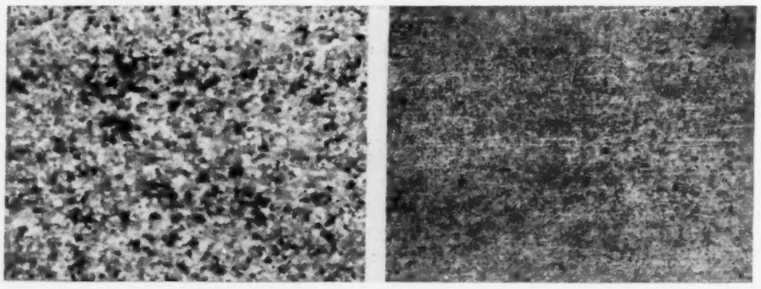


Observe the difference in grain size of these fractured specimens containing 25 per cent chromium and 0.15 per cent carbon. The specimen at the left contains 0.05 per cent nitrogen and the one at the right contains 0.15 per cent nitrogen.



Note the grain-refining effect of nitrogen in these macro-etched, as-cast specimens containing 25 per cent chromium and 0.13 per cent carbon. The specimen at the left contains 0.044 per cent nitrogen and the one at the right contains 0.19 per cent nitrogen.



These macro-etched specimens show how nitrogen reduces the grain size of hot-worked steel containing 25 per cent chromium and 0.13 per cent carbon. The specimen at the left contains 0.044 per cent nitrogen and the one at the right contains 0.19 per cent nitrogen.

Comments

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Correcting Corrosion Data

To the Editor:

I desire to call attention to the article on page 66 of the Dec. 12 issue of STEEL, based on the extemporaneous talk I gave before the Cleveland chapter of the A. S. T. M., Nov. 30.

In accepting the invitation to speak on the corrosion problem at that meeting it was necessary for me to stipulate that no paper would be written, but I attempted to outline briefly the more recent progress that had been made in combatting corrosion. Some of the statements attributed to me are not entirely correct and do not agree with my recollection of the discussion and may give a wrong impression. Therefore, I thought it better to write you on the subject so that you will have the correct version of these points, without attempting, however, to give a complete review of this talk.

The use of a very small amount of hexametaphosphate of soda (two parts per million) and some other compounds that raise the saturation value of certain salts in water permits the use of higher alkalinities, which should materially reduce the tendency to corrosion without precipitation of insoluble salts, as, for example, in water cooling systems. While this new water treatment is quite promising, its value has not yet been fully demonstrated by service tests.

You quote me as saying that one-half of the tubes used in the petroleum industry are alloy steel containing 3 per cent chromium with some molybdenum. What I did say was that over one-half of the *cracking* tubes now used in *oil refining* are alloy steel and there is a tendency at present to use steel containing 2½ or 3 per cent chromium with molybdenum and some higher chromium alloys in place of the well-known 4-6 per cent chromium type.

In regard to the progress made in the use of high strength slow-corroding steels it would be more correct to say that the use of high strength low alloy steels for structural members is improving corrosion resistance and, at the same time, is permitting a 10 per cent reduction in the weight of the ship structure, with corresponding increase in pay load.

Another example of the advantages of such materials cited is in railroad freight equipment. Here superior corrosion resistance makes it practical to use these high strength steels in lighter sections. The weight of the car can be reduced as much as five tons, which is equivalent to adding the same amount to the load-carrying capacity. Savings in operating costs are estimated at $12 to $18 annually for each ton reduction in car weight.

In regard to cathodic protection, which is proving of great service in connection with underground piping, it has been estimated that the cost of the necessary electrical installation is about one-fifth the cost of a single wrap asbestos felt bituminous coating 3/32-inch thick, and which by itself does not afford adequate protection in corrosive soils. It is usually desirable to apply a high resistance coating of this type to limit the area that requires electrical protection, and apply cathodic protection later on where required.

In estimating the cost of corrosion protection and some of the savings that had been effected, I pointed out particularly that the records are necessarily incomplete and lacking in accuracy. I referred to an estimated saving in oil-refining up to 1932 of about one cent per gallon of *gasoline* produced, not *petroleum products*. These rough figures, however, are not important, as corrosion must be controlled in some measure in such industries, as it is usually an important factor in economical operation. This may be accomplished either by using a more resistant metal, a suitable protective coating, or by treatment of the environment. The main purpose of this talk was to indicate that corrosion involves a number of economic problems and that new ones are constantly arising with industrial progress.

It is to be regretted that a copy of your editorial was not submitted to me for review before printing, as some of the points discussed by me were apparently misunderstood by your representative.

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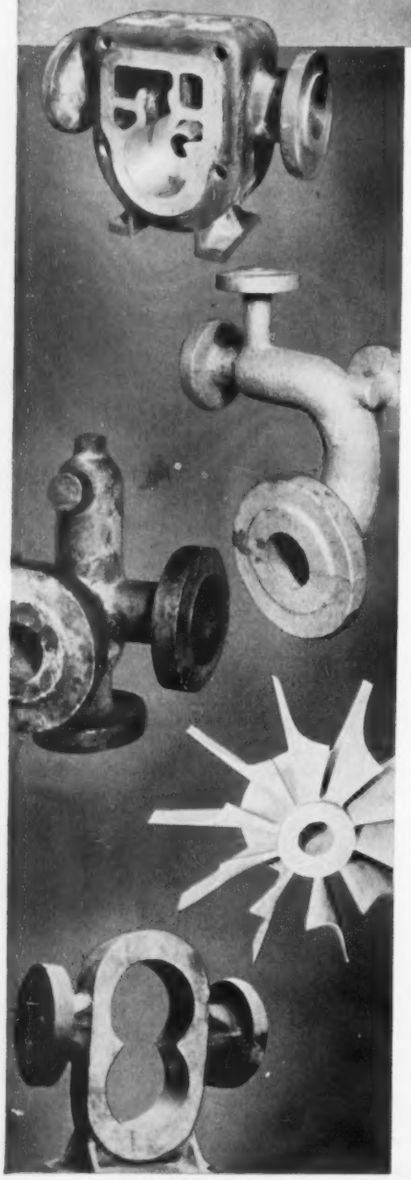

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